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The Uneasy Laurel Wreath

THIS mantle of world leadership is a prickly affair. It was all so much easier being just a big nation, preoccupied with tax cuts, export markets, profits, strikes and such.

To be sure, throwing the gauntlet down to Stalin's police state is something the country takes to with gusto. But assuming the laurel wreath of a "great nation" demands vision, patience and continuity of effort, regardless of political upheavals at home. It's no snap affair—exciting today and ignored tomorrow—it takes more than a mailed fist, and making sounds like uranium fission. It takes intelligent self-discipline and sacrifice, at home and abroad, in order to hold the head high, to keep the wreath straight. A couple of fumbles, or facile policies of least resistance—and down slides the wreath at an awkward and embarrassing angle!

Just why should the President's pronouncement on Greece and Turkey be the occasion of such shocked surprise? Why so much bewildered vocal scurrying on the part of politicians, columnists and commentators. And, more pertinent, just why this hasty, last minute awareness of crisis?

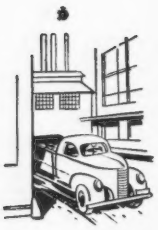
Two costly wars have been fought to dictate who rules the other side of the ocean. England is no longer up to the role of fall guy in the thankless task of world policeman. The creeping power of Russia won't stop without being stopped. And power politics can hardly fail to ignore the oil-fields just to the southeast soon to supply half the world's needs. At long last, America must face up to the subtle difference between feeling great and being great. The cruel facts of life permit no more of this shying away, this easy criticism of others, this panic flight into isolation.

There can be some occasion for regret that the barricade is set up in Greece and Turkey: the former a nation embittered and corrupt politically for centuries, the latter poverty-stricken and barely conscious of western ideals, a nation which had to be bribed into neutrality during most of the past war.

Greece has a long history of people brutalized by a corrupt central government. The King is an incompetent that the British can hardly stomach. Like China, and like other countries whose cry for help will soon come, Greece poses two courses of action. Is communism to be contained by pouring in money, by propping up reactionary governments with brute force? That course leads to certain immediate appearances of success, only to be followed by eventual exhaustion, to future withdrawal in the face of communist infiltration nurtured by popular disillusionment. Or is communism to be contained by the unleashing of democratic pressures? The true measure of America's new greatness depends on whether, by precept and action, there is a reconstruction of Grecian political morale sufficiently dynamic in itself to resist ideological inroads.

Greece has historically been the stake for countless classical tragedies. Her modern tragedy—indeed the world's tragedy—would be that America in her preoccupation with establishing a military front line should fail in her responsibility to fan the flame of political and economic morality.

T. W. Lippert



Special duty trucks gather steel samples for the laboratory.

A truck is unloaded at the laboratory, and immediately starts another round trip.

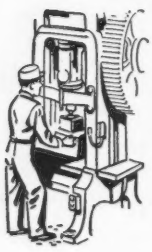
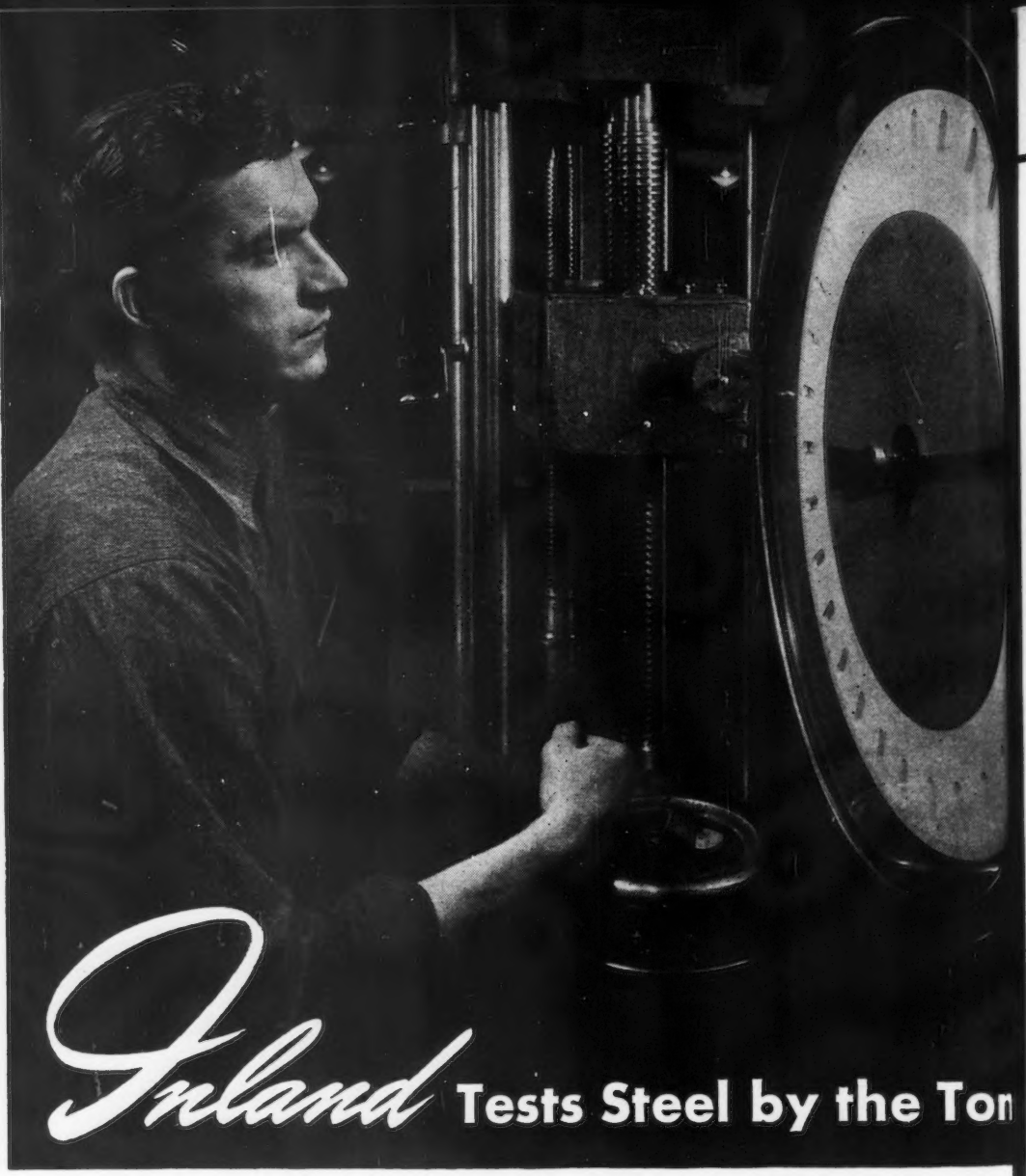


Plate samples are punched to rough form, then milled. Others are sawed, turned, drilled, etc., as required.



Inland Tests Steel by the Ton

Operator determining physical properties on one of the many tensile testing machines in the Inland laboratory.

Many samples undergo rigid chemical tests.

Darting from mill building to mill building—many times a day, and at night—are Inland trucks on special duty, a duty of vital interest to every user of Inland steel.

They are the sample trucks which rush samples of Inland products to the main laboratory where all required tests must be completed, reported and checked against specifications before steel is shipped.

Samples are gathered for the laboratory at semi-finishing mills—pieces from billets, slabs, etc., that will be tested before the steel is rolled into final form. Also collected are samples of finished products. Depending upon requirements, every piece of steel delivered to the Inland laboratory undergoes rigid physical, chemical, and metallurgical tests. Many of these tests are special developments by Inland—tests that are fast and extremely accurate.

Yes, Inland daily tests tons and tons of steel to assure every customer that his order will measure up to every requirement.

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► Advance sign of possible easing in the steel supply picture in months to come is the difficulty some holders of steel are having in selling it at premium prices—or at least at prices paid no more than a month ago. Some manufacturers who have been selling that portion of their receipts which they didn't need for their own use are not sure they can continue to get premium prices and are considering cutting orders to their actual requirements.

► The United States, now turning out more than 50 pct of the world's steel has only about 10 pct of the world's ore reserves. It is expected that low grade ore beneficiation in the Lake Superior region will boost U. S. reserves, but unless it becomes commercially feasible in the reasonably foreseeable future unusual dependence may have to be placed on foreign ores—with relocation of mills in prospect. This may explain why a large steel producer is still considering an East Coast plant.

► One encouraging aspect of the scrap situation in Detroit is that certain items acquired by dealers and heretofore sold as parts are moving—at today's high prices—as scrap.

► British officials are taking their demands for steel mill reparations from Germany seriously. Steel Board experts are on Mr. Bevin's staff in Moscow, and the final knockdown battle is expected to take place over the sintering equipment and the rolling mills at Saltzgitter.

Cynical British officials expect to win the agreement with the Russians, only to see the Inter-Allied Reparations Agency in Brussels allocate the machinery to France or Belgium.

► Tests indicate that installation of water softeners in plating shops improve plated part quality and increase pickling bath life. Other advantages reported are a reduction in drag-in, elimination of sludge in hot alkaline baths, improved adhesion and easier rinsing of burnished parts. Burnished parts are said to get a better finish and deposits are more easily buffed.

► A report that four of the smaller steel companies are planning to discontinue sale of hot rolled sheets is causing considerable concern to stamping manufacturers, some of whom use up to 90 pct hot-rolled sheets. However, there is no indication that some of the largest hot-rolled sheet producers have any intention of going out of production on this item.

► The looting of coal trains in western Germany proceeds with regularity; it is estimated that individuals carried off more than 5000 tons at Cologne on a single day in January. In the Ruhr, the almost indescribable housing situation has grown so bad that the Nissen hut erection program has been curtailed in order to speed up repairs.

► The use of inert gases such as nitrogen and argon in the distillation and separation of contaminating elements from nonferrous scrap has reached significant proportions. The technique permits recovery of copper from brass scrap and aluminum from practically worthless aluminum alloy scrap in an atmosphere entirely free from water vapor, carbon dioxide and carbon monoxide. Hydrogen absorption is held to a minimum.

► Carbon restoration to a decarburized steel surface is practicable by controlling heating furnace atmospheres. This avoids the expense of machining off the surfaces of highly stressed parts which have lost some carbon because of heat treatment or heating prior to forming operations.

► Steel mills in India, faced with a shortage of pig iron, report that the scrap carbon process produces steel with quality as high as conventional scrap-pig steel. Carbon deficit in the charge is made up by petroleum coke; silicon deficit by the addition of acid slag to the molten bath.

► A process of imbedding machinable inserts in carbide parts prior to their manufacture now permits such parts to be attached to other materials by screws or studs, opening up new uses for carbides on dies, liners and the like.

► While steel companies still retain the multiple basing point setup some variations have appeared. In cases where a competitor makes the same product in the specified sizes, mills at distant points will still absorb freight to meet local basing point prices. But if no competition exists the user must pay the freight from the point of manufacture.

An Economic Approach To Hardenability

By D. I. BROWN
Chicago Regional Editor

Recent rises in steel prices warrant a close survey of the economic factors concerning hardenability, in view of the marked trend toward selecting many alloy steels solely on the hardenability basis. In this, the first part of a two-part article, the author presents graphical data comparing various alloy steels and the cost per unit of hardenability obtained from these steels. The correlated data reveals some interesting features which can be useful in the selection of the most economical alloy steel for the purpose intended. Special properties, characteristics or application wherein hardenability is not the prime requisite, are not considered in this study.

FOR the past few years industry has been given much expert advice and considerable data concerning the precise hardenability characteristics of alloy steels, and what steel to use for a given application. Now that the new steel prices are in effect many users are examining quantitatively the amount of hardenability they get for their money. In the past, metallurgists have had enough to worry about with hardness center and surface, *H* steels, minimum and maximum hardnesses on the bands, *H* value of the quench, *DI*, carburizing characteristics, standard and non standard chemistries, calculated v. actual hardenability, draw temperatures, decarb, recarb, ad infinitum.

Steel costs v. hardenability adds another variable to the already overloaded duties of these men, but those who formerly believed that the cost feature was just another added imposition which could be overlooked are beginning to reconsider in the light of present prices. (See table I—p. 47).

Table I shows the percentage increase in cost resulting from the recent price raises in grade extras for each individual steel. It will be noticed that the non-chromium, silicomanganese spring steels, which were losing items (profitwise) to the producers, were given a substantial increase. Likewise, the 1300 series was substantially increased and to a lesser extent, many carburizing grades. The electric furnace steels did not advance as much as the openhearth grades.

Pressure during the war caused the alloy industry to adopt the expedient of basing the choice of steels almost wholly on hardenability. This concept is for the most part sound and was proved by the successful use of about 6 million tons of the NE steels. Consumers learned that the newer Ni-Cr-Mo grades could be used instead of the older single or binary-alloy types and that the modifications in heat treatment which were necessary to duplicate former properties were not extensive. Because many of the applications of alloy steels are now being so widely judged and selected on a hardenability basis alone, the breakdown of hardenability v. cost per pound has taken on added interest.

The new list of standard alloy steels dropped 52 standard grades (see table II) formerly obtainable, much to the consternation of some consumers. Many companies are learning that the steel specified on the drawings of many of their parts have been declared obsolete and they want to know, "who says so and why?" Consumers who berate AISI for arbitrary decisions probably do not realize that consumers are represented on the grade committee by SAE. The two societies arrive at the choice of standard grades after consulting all available data, which is gathered on a national scale. Their decisions, therefore, are much sounder and more fair than some users believe. When SAE consented to drop certain grades, which some consumers now believe should be continued, the reason was because of the comparatively small tonnage produced in that grade or the fact that consumers failed to notify their representatives on the SAE committee concerning the types and exact tonnages of steel used. Generally, the consumption or production of around 10,000 tons of any single grade per year is judged large enough for the grade to be classified as a standard type.

In a cost per pound comparison of openhearth alloy bars of similar carbon levels, it is readily apparent that hardenability is anything but proportional to price. Obviously this must be so, since the different alloying elements not only differ in price, but also in their effect on hardenability for a given amount added to a steel. The difference in the efficiencies or yields obtained from the various ferroalloy additions introduces other variables peculiar and characteristic of certain of the alloys. Yields on alloys added to heats in the furnace differ with carbon content of the bath and state of oxidation so that a linear proportion, even in the same alloy grade, is not possible. The prices

taken for the comparisons made in this article are the grade extras, not the base price, as all standard constructional alloy steels are sold on the same base.

The steel industry, as a whole, uses the maximum alloy content of the alloy range of all steels as the criterion in computing price. With the prices figured at the maximum chemistry and precise hardenabilities based on minimum hardnesses, the correlation between cost and hardenability presents a few problems. Alloy steel at the moment is bought by two methods; (1) some consumers purchase to standard chemistry with no hardenability specifications, while (2) others buy *H* steel* chemistries to very definite minimum, maximum, or minimum and maximum hardenability. On a tonnage basis more steel is sold on the former method than on the latter.

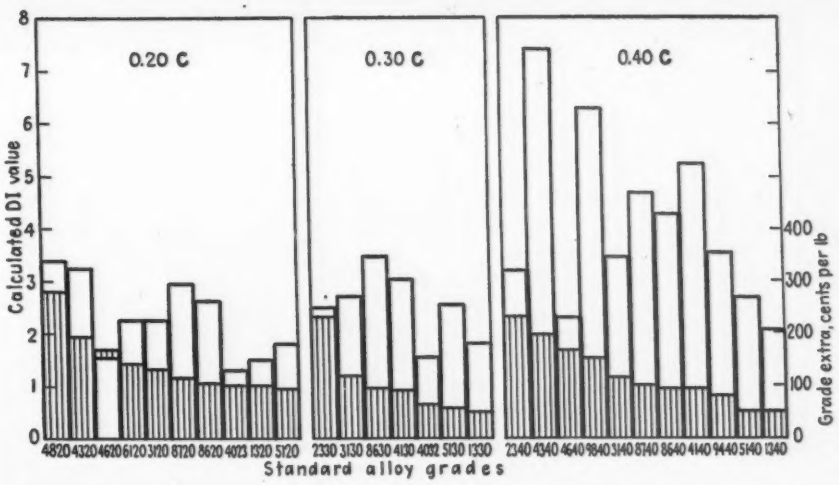


FIG. 1—Openhearth alloy bars. (Price figured on grade extra alone as all base prices are identical for each grade).

Under such conditions, the cost v. hardenability study presented in this article is designed to cover either of the principal methods. Obviously, a buyer of alloy who does not specify definite hardenability, depends on averages and can use heats of either high or low chemistry. For this reason the first comparison is based on the hardenability secured from the mean of the chemical ranges, for statistically this would be the only reliable index. Calculated, rather than actual hardenabilities, are used in the first instance for the following reasons: All standard alloy steels can be included, the difference between calculated and *H* band methods can be shown, and anyone who buys by this method is not too greatly interested in precise hardenability, as the deviation of calculated values from actual, although large in cases, is still within the tolerance permitted by these consumers.

The second method, wherein hardenability is based on the minimum of the published *H* bands, appears as the only solid dependable yardstick to use if exact, consistent hardenability is needed. This method clearly demonstrates why calculated hardenabilities have been discarded, and why the minimum *H* band *DI* values v. cost are by far the better criterion. The only drawback to the second procedure is that all steels have not yet been classified in *H* chemistry and only a limited number of bands are available, so that the comparison is restricted in scope.

In fig. 1 the steels in three carbon levels are arranged in decreasing cost per pound, which is represented by the solid bar. The calculated *DI* values were added for each grade and are shown as hollow bars on the graph. It was found that 4620 was the only alloy steel of the group wherein the cost per pound exceeded the unit *DI* value, when both functions are compared on the basis of one unit *DI* to $1.00 per lb in cost. It will be noted that the 1300 series is the cheapest in cost per pound, except in the 0.20 C series, where the use of low carbon ferromanganese is mandatory. Also apparent are the pair of steels in the 0.20 C grades and the two pairs in the 0.40 C grade, which are identically the same in price but of widely different hardenability.

In compiling fig. 1, the measure of hardenability chosen was that of calculated *DI* from the mean of the standard chemical ranges. This calculation was performed on the Stephenson-Pfahl hardenability slide rule, which has been distributed by the Carnegie-Illinois Steel Corp. The slide rule incorporates Dr. Grossman's original concept of calculated hardenability with slight modifications of the various factors which have been established by added experience during recent years. The percentages of phosphorus sulfur and silicon were held constant as well as was grain size, so that the elements affecting *DI* are manganese, nickel, molybdenum, chromium, vanadium, and of course carbon content.

In all calculations the constants arbitrarily chosen were; phosphorus 0.02, sulfur 0.02, silicon 0.25, and

* *The H steels are standard AISI steels of the ordinary alloy types which are sold with definite hardenability guarantees as measured by the end quench test. The chemistry ranges of H steels although similar to standard steels are slightly wider in most elements. Tentative hardenability bands for each H grade are available. See AISI and SAE "Contributions to Metallurgy of Steel—No. 11, July, 1944."—Ed.*

TABLE II

Former Standard Alloy Grades Dropped From 1947 Standard AISI List

All grades OH unless otherwise shown

1345	8712	9722
1350	8715	9727
	8722	9732
3240	8725	9737
	8727	9742
	8730	9745
4119	8732	9750
4120	8737	9768
4125		
4134		9830
	9415	9832
	9417	9835
4342*	9420	9837
	9422	9847
4645	9425	
	9427	9912
	9430	9915
8612	9432	9917
	9435	9920
9312**	9447	9922
9320**	9450	9925

* Electric furnace grade.
** Both electric furnace and openhearth.

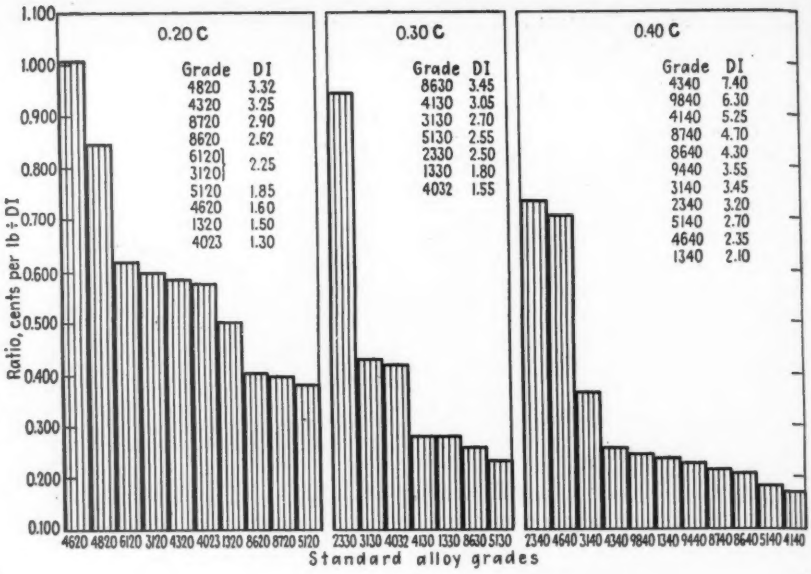
grain size No. 7. It should be remembered that the calculated *DI* was based on regular standard alloy chemistry and that the *DI* so derived will seldom match that figured from *H* steel analyses. The chemical ranges of the *H* steels are wider and vary slightly in most elements. As an example, the calculated *DI* for straight 4340 is 7.40, but for 4340-H the calculated value is 7.80. The actual minimum *DI* for 4340-H at 34/16 or the 50 pct martensite hardness is 6.50. This point is taken up later in greater detail.

As fig. 1 demonstrates, cost v. hardenability varies widely, and since the trade is in good agreement that more than one steel can satisfactorily be used on the same application, it is apparent that the ratio between the two becomes important to anyone concerned with cost. Assuming that the section for a part is such that a job could be done with the available hardenability of either 2330 or 5130, the latter steel is a natural choice because of price, since both have the same *DI* value. In order to better appraise this feature, the data presented in fig. 2 was developed. This is a comparison of the same steels appearing in fig. 1, but on the ratio of cents per pound to *DI* basis, i.e. the lower the factor the less the cost per unit of hardenability obtained. In each carbon level the grades are tabulated in the decreasing order of hardenability. In the graph the steels toward the right of each group are of the lowest ratio and therefore, the most for the money. The two old NE steels and the 5100 series consistently stand out as most economical, while the 1300 series, which from fig. 1 appeared to be relatively cheap, becomes more expensive in comparison when viewed from a cost ratio basis. This is not true for the 5100 series, however. In fig. 1 this type appeared to be low in cost and in fig. 2 it is substantiated that this series continues to be relatively low priced for the hardenability obtained. Of the 0.30 C series it will be seen that 4130, although fairly low in cost, is not the best choice. Conversely, in the 0.40 C series, 4140 leads the field. Many consumers have always insisted that 4140 was the best medium carbon alloy of the entire list, and in view of the cost ratio it would appear that more consumers will now agree.

All of the steel series are not carried as standard grades in all carbon levels so that they could not be compared across-the-board. Another interesting feature apparent from fig. 2 is that the cost ratio decreases as the carbon content goes up. This fact has been known to steelmakers and metallurgists for years, but only recently have steel sales divisions taken cognizance of this fundamental information. The trend of lower cost with higher carbon content does not always hold true for all grades, and at sufficiently high levels the trend in certain cases reverses itself.

As a demonstration of the practical application of the cost ratio, fig. 3 is introduced. According to authoritative information, the heavy mill tonnage spring steels ordered for parts which are oil quenched and tempered to a range of 175,000 to 240,000 psi are as listed. This application can be reliably based on hardenability alone. The grades shown are the heavy tonnage types produced during the prewar and wartime period. The types of springs for the various vehicles when separated show some of the same grades to be popular in each application.

No attempt will be made here to judge the age-old argument of whether 50 pct or 100 pct martensite is needed throughout a quenched-out section, be it a spring or any other part, other than to mention that consumers have never proved they actually used or required 100 pct martensite in the core or center of a part. It is obvious that many parts could not have contained anywhere near the 100 pct figure, since to do so the consumers would have had to use the 4300 series, or steels of equivalent hardenability. Partially-quenched-out structures showing upper transformation products such as bainite, many times show the identical hardness after tempering as does the same section consisting of 100 pct tempered martensite. This is not always the case, but it is an established fact that only the most expert metallographers can distinguish between lower bainite and tempered martensite in the same medium carbon steels. On the other hand, it is often found that the upper transformation products which precede the formation of martensite may also be pro-eutectoid, ferrite or pearlite. These factors are not of too great importance in this article, however, since *DI* values are based on 50 pct martensite at the center of the section. J. M. Hodge and M. A.



ABOVE

FIG. 2—Ratio of cents per lb to calculated DI.

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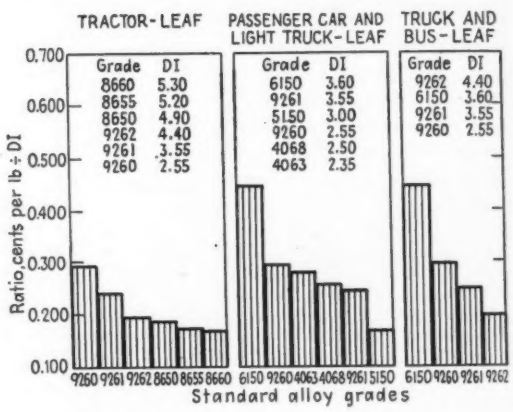
RIGHT

FIG. 3 — Spring steel, heavy tonnage grades. Oil quenched and tempered to 175,000 to 240,000 psi. Ratio of cents per lb to calculated DI.



Orehoski[1] have presented a method of figuring actual *DI* for a number of martensite structures and this concept will be discussed later.

A word of caution is introduced here to those not familiar with all the ramifications of the science of hardenability. The section, thickness or volume of a part is the first limiting factor in choosing a grade to do a job. Only certain steels quenched in certain media will produce certain percentages of martensite in the center, depending on the exact size of the piece. Considerable literature is available on this phase, some of which is listed in the appended bibliography. To take advantage of the cheaper steels it must first be ascertained whether the section and quench permit such a choice to be made.

[1] *J. M. Hodge and M. A. Orehoski, "Hardenability Effects in Relation to the Percentage of Martensite," Metals Technology AIME, April 1946.*

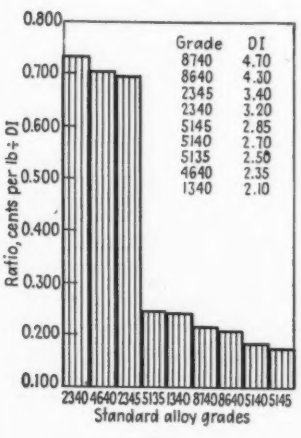
Fig. 3 again leans favorably to the ternary lean alloys for tractor leaf-spring application, whereas the popular silicomanganese grade proves to be a costly choice. It is not always possible to precisely rate austenitic grain size in the 9200 series through the use of the McQuaid-Ehn tests. For that reason the No. 7 grain size rating used in the calculations of *DI* for this grade are purely arbitrary. It would seem that 6150 in the other two leaf-spring classifications is also an uneconomical steel. In the tractor leaf-spring comparison, it is well to note that the order of ratio values are exactly reversed from the order of *DI*, so that the deepest hardening grade is the cheapest and vice versa. The possibility of the 8600 series in the other spring applications should not be overlooked, particularly by metallurgists who claim that they must have 100 pct martensite in a quenched-out section. Although, in an adequate quench, some of the other steels used in the lighter sections should quench through to practically 100 pct martensite, the cost ratio figures indicate that in this case, using a steel of excess hardenability, a saving is possible. The only possible exception in this particular case is the 5150 grade for passenger car and light truck springs.

Fig. 4 covers gear steels used in passenger cars, light trucks and tractors, which are ordinarily heat treated to a range of 250,000 to 300,000 psi. Here again actual heavy tonnage grades were chosen and it has been established that in most applications these strength requirements can be based solely on hardenability. It is interesting that the two steels showing the greatest *DI* are the cheapest obtainable, with the exception of the 5100 chromium type. It is also most obvious that if present prices are maintained, the 2300 and 4600 series will lose much popularity unless industry chooses to ignore the cost factor.

Fig. 5 concerns the popular carburizing gear steels which are hardened and tempered at 300° to 350°F to produce a strength level of 110,000 to 150,000 psi. It is generally agreed that the calculated *DI* on low carbon alloys is not as close to actual results as it is in higher carbon steels. As a general indicator, however, this index still serves the purpose. The 2512 grade shown in fig. 5 can only be purchased in the electric furnace type as a standard steel, and in the calculation, the nickel was restricted to 3½ pct since that is the extent of both Bethlehem's and Carnegie's hardenability slide rules. For this reason the cost ratio on this one grade may be entirely out of line. Of the steels listed as heavy tonnage in heavy tractor, truck and bus vehicles, grade 2320, which was popularly used in the past, has been dropped from the list of standard steels. This grade has not been used in the comparison, since the grade extra must be obtained on application and the 10¢ additional extra would boost the cost ratio to a figure disproportionately high. Also declared obsolete are four steels formerly used in the lighter vehicle production.

An interesting comparison presents itself in the case of 4615 and 1320 for light car gears, in fig. 5. Both grades have the same *DI* but the nickel-molybdenum grades cost more than twice as much as the 1300 manganese type. Admittedly, the carburizing characteristics of the two steels are different, particularly in carbon buildup at the surface, but many metallurgists believe that for this particular application carburizing is secondary to hardenability, and the requirements for this job do not justify the high-priced 4600 series. Many of the same metallurgists also admit that they would not use the 1300 series either. This is to be expected, since three Amola grades, one 8700, two 8600, one chrome-vanadium and a straight chromium type are available, all of which except one Amola type, are of higher hardenability (and five of which show a lower cost ratio).

A comparison is given in fig. 6 of the deeper-hardening steels used in heavier sections. The particular application chosen shows eight steel types that were predominant in use prior to, and during, the war. Again, if hardenability is the important feature, the rational choice could



ABOVE

FIG. 4 — Automotive gear steels. Quenched and tempered to 250,000 to 300,000 psi. Passenger car, light truck and tractor applications. Ratio of cents per lb to calculated DI.

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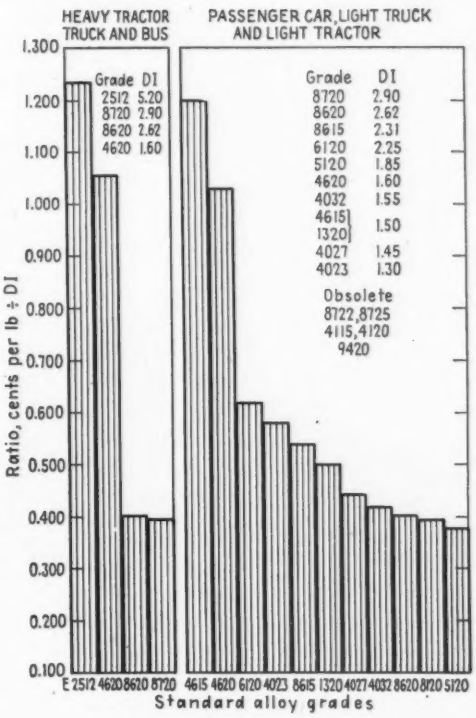

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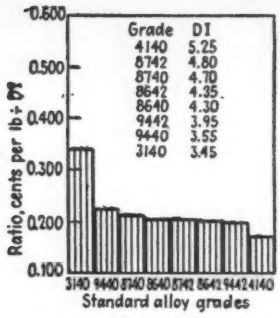
FIG. 5—Carburizing automotive gear steels, tempered 300° to 350°F to 110,000 to 150,000 psi.



ABOVE

FIG. 6—Alloy grades used in heavy tonnages for oil well drilling equipment parts—tool joints, drill collars, jars, Kelley bars, reamer bodies.

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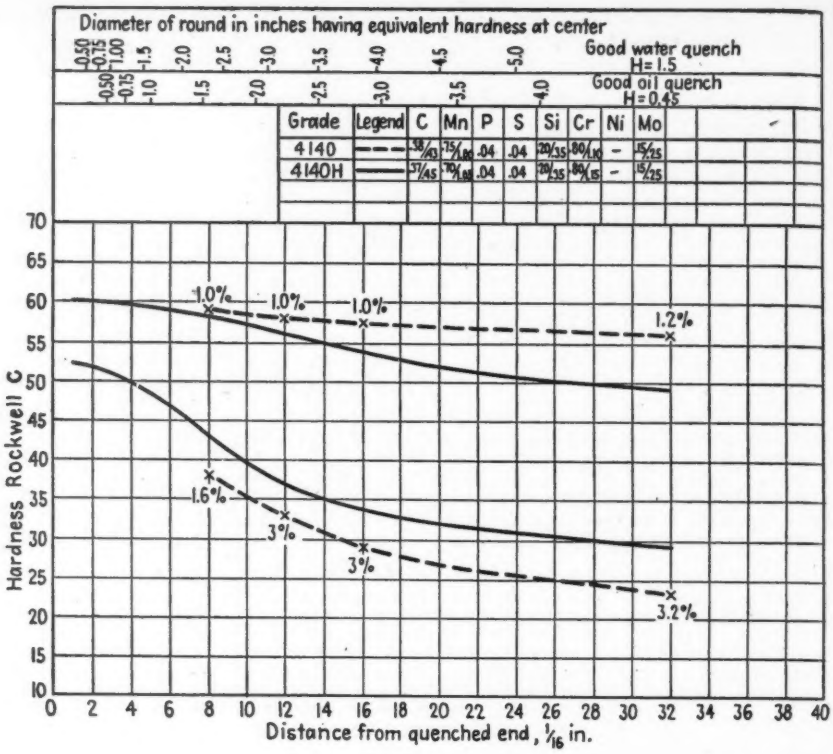
FIG. 7—The percentage values shown on the dotted curve represent the number of heats occurring at those limits. For instance at J-12 on the min curve, 3 pct produced Rc 33 or softer.



only be a 4140 steel unless the consumer is worried about varying residual nickel or the possibilities of a few points better Rockwell C quenched hardness available in the 0.42 C grades. Hardness is of little importance, since 4142 is a standard grade which could be used for this part and it costs no more than 4140. The only drawback to 4140, compared with the 8600 or 8700 types which are slightly more expensive, is that the latter are available with narrower hardenability bands in *H* steel chemistries. The reason for a narrow hardness tolerance on the ternary types has always been attributed to the control of all three hardening elements, nickel, chromium and molybdenum. In the 4100 series the nickel content may fluctuate from zero up to the maximum residual allowed and, therefore, produce a wider band tolerance. However, this reasoning is not borne out in comparing 9440, a ternary chrome-nickel, molybdenum steel, to 4140. In this case the width of the band for the ternary grade is not narrower than that for the binary, or 4140 steel. The reason for this apparent anomaly is the manganese range of the 9400 series. Revised curves on the effect of manganese on hardenability disproved the old belief that manganese is a straight line function.

It should be again stressed that the cost study presented in this article has been based on standard chemistry, but the discussion above on band widths had to be based on *H* steels of the same type wherein the chemical ranges differ from standard. The second portion of this article will cover some of the *H* steels. It will be shown that *H* band *DI* is not proportional to calculated *DI* and that the cost v. hardenability ratios change surprisingly.

A controversial point between the hardenability of the *H* steels and that of the standard chemistry grades is not properly part of this study, but in the light of the considerable discussion on this subject it seems appropriate to mention a few facts. The *H* steels are purposely called tentative for many reasons. They were based on actual hardenability studies of hundreds of alloy heats made to standard chemistry. What many metallurgists cannot understand is why the hardenability of the *H* steels, originally based on a study of standard chemistry, should not apply on the standard chemistry steels. In fact, the widening of the spread of the chemical ranges of the elements for *H* steels would appear to promote, statistically at least, wider hardenability spreads than if the bands had applied to the standard steels. This is not the case. Fig. 7 represents a study made by the joint SAE-AISI committee on *H* steels. The broken line shows the limit of actual hardenability taken on many heats of standard chemistry. The *H* band for this same grade melted to the wider *H* chemistry is decidedly narrower. This fact has not been clear to many metallurgists in the past.

SAE is attempting to get producers to agree to narrower bands and it appears likely that the society will be successful. When an agreement is reached, it is certain that narrower bands will be adopted, but the chemistry ranges will be made even wider than the present *H* steels. Obviously, if the exact analysis of any grade were left to chance, it would not be possible to secure narrower hardenability tolerance with wider chemical ranges, and it is not necessary to resort to statistics to prove this fact.

In melting *H* steels nothing is left to chance and all residuals are taken under consideration when adjustments in alloy additions are made. It has always been the mills' contention that only by widening the ranges have they the room to manipulate the alloy and carbon content so that the resultant hardenability falls within the prescribed limits. They have further claimed that if they tried to meet the *H* bands with regular chemistries, the off-heats would increase to an unwieldy amount. Furthermore, the important feature is hardenability and not minute differences in chemistry. None of these points can be refuted. It is the

consensus of many hardenability experts that eventually alloy steels will be ordered to a hardenability band only, with the choice of alloys and their content left to the discretion of the steelmaker.

The cost v. hardenability study has been presented here, neglecting other special metallurgical characteristics and properties. Authoritative steel sources say that over 50 pct of alloy applications can be safely based on hardenability alone. Other features would modify the choice of the grade for a given job, but even in some of these cases a choice of steels of different price would be used.

The author will continue this discussion of cost v. hardenability in a subsequent issue of THE IRON AGE, *wherein the use of H band DI values is proposed as a more suitable index for hardenability control.—Ed.*

TABLE I

Percentage Increases in Cost of Various Grades of Steel Resulting From Recent Prices Raises in Grade Extras

Openhearth Steels

Grade	Increase, Pct	Grade	Increase, Pct	Grade	Increase, Pct
1320	650	3150	35.3	4317	37.9
1330	400			4320	31.0
1335	400	4023	66.6	4340	11.7
1340	400	4024	82.0	4608	54.2
		4027	44.5	4615	50.0
2317	47	4028	63.7	4620	41.7
2330	38.2	4032	44.5	4621	45.8
2335	38.2	4037	44.5	4640	37.5
2340	38.2	4042	44.5		
2345	38.2	4047	44.5	4812	new
		4063	44.5	4815	34.9
2515	29.5	4068	44.5	4817	new
				4820	30.2
3115	59	4130	21.4		
3120	59	4137	28.6	5045	42.8
3130	35.3	4140	28.6		
3135	35.3	4142	28.6	5120	50.0
3140	35.3	4145	28.6	5130	33.3
3141	35.3	4147	28.6	5132	new
3145	35.3	4150	28.6	5135	new

Electric Furnace Steels

Grade	Increase, Pct	Grade	Increase, Pct
2512	29.5	52095	15.4
2517	24.6	52098	15.4
3310	2.33	52100	15.4
3316	1.16	52101	15.4
4132	12.5		
4135	16.7		
4137	16.7	6150	23.5
4337	9.10		
4340	9.10		
4617	48.4	9310	2.33
4620	41.9	9315	1.16*
4640	38.7	9317	1.16*

*Decrease.

Automatic Lathe Speeds Cut Off Operations

IN KEEPING with the realization that industry can survive at current wage levels only through increased productivity, machine tool builders are concentrating on greater automaticity and a higher degree of simplicity of operation in the new designs now going into production. Just announced by Bardons & Oliver, Inc., Cleveland, is a Hydralectric automatic lathe designed to fill the demand for a high production machine for chamfering and cutting off a large variety of parts made from pipe, tubing or solid bar stock. This machine, illustrated in the accompanying photograph, is an outgrowth and development of the 3-in. and 4-in. cutting off machines built for a number of years by this company and is made in two sizes, designated as the No. 33, with a capacity of 3-in. tubing, and the No. 34, capable of taking 4 in. tubing through the collet chuck plunger.

Both models can be operated either as full cycle automatics or as single cycle manually controlled machines. As an automatic they are capable of 30 or more full cycles per minute, with one or more pieces being produced for each cycle. As a single cycle type they serve for cropping or trimming the ends of tubing and similar machine operations.

The two tool-carrying slides, one in front and one in back of the work, are hydraulically controlled and operated. An equalizing mechanism insures that the two slides work in unison and that the same size of chip is removed by the front and rear cutters. The in and out and rapid traverse slide movements as well as the control circuit, are hydraulically operated by a geared pump built in as an integral part of the spindle drive transmission. An adjustable volume pump mounted on the front of the column, and driven by the spindle, meters out oil for the feed stroke.

The stock is gripped by a hinge-type collet which is opened and closed hydraulically in synchrony with the functioning of the front slide. A roller feed at the rear of the spindle moves the stock through the spindle and collet chuck against a solenoid operative receding stock stop. The solenoids are energized by a switch mounted on the saddle and operated by a dog on the front slide in timed relation to the opening and closing of the collet.

Four quick spindle speed changes are available by means of sliding gear clusters, and pick-off gears provide a total of 72 spindle speeds ranging from 85 to 1100 rpm.

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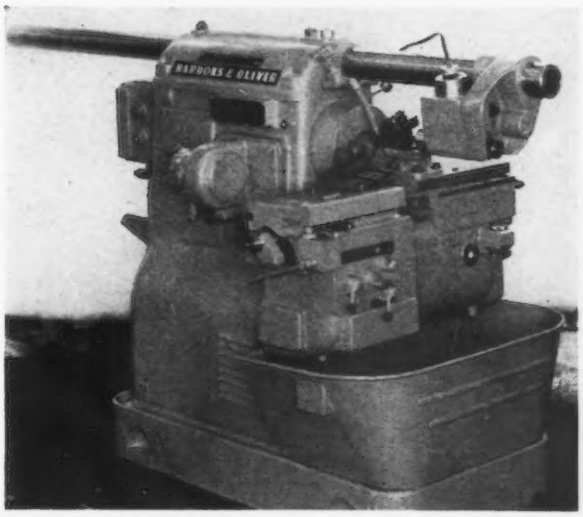
DESIGNED as a high production machine for chamfering and cutting off pipe, tube or bar stock, this combination hydraulic and electric lathe by Bardons & Oliver shows the trend towards more complete automaticity.



Effect of Water Conditioning On

Use of softened water appears to offer many opportunities to metal finishers for improving the quality of plated parts and for extending the life of pickling baths. This article describes an investigation to determine the effect on plating and cleaning cycles of (1) hard water, (2) softened water, and (3) demineralized water. Among the advantages of using conditioned water are a reduction of drag in, improved adhesion, elimination of sludge in hot alkaline baths, better finishes on burnished parts, easier rinsing of burnished parts, and more easily buffed deposits.

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By ROBERT S. HERWIG

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THE sustained high rate of operations on the part of electroplaters and other metal finishers, in the face of continued shortages in metal finishing equipment, has frequently resulted in shops and baths working on a 24 hr per day schedule. To keep baths operative under such a pace requires constant additions, purification and filtration.

Despite precautions normally taken to keep the baths operating properly, plated parts often begin to blister for no apparent reason, the quality of the plate will deteriorate, or the rate of deposition will fluctuate. Sludge builds up in the bottom of the hot alkaline baths requiring either dumping the bath or pumping out the solution and removing the sludge from the bottom of the tank.

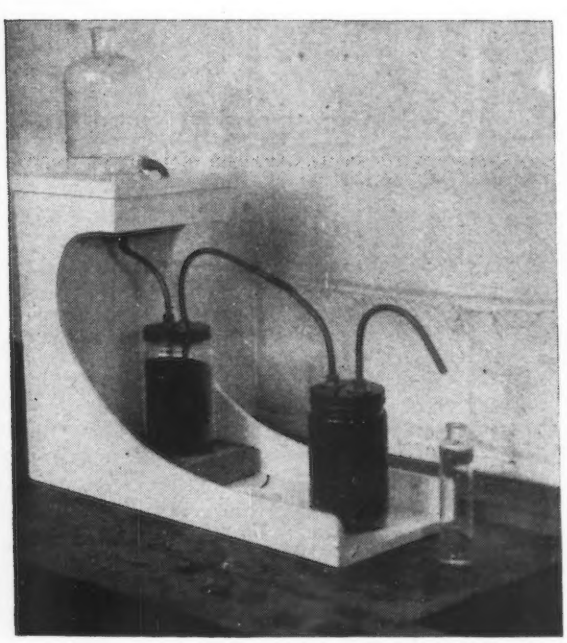

FIG. 1—Experimental setup used for demineralizing hard water high in solid content.

Another aspect of this high rate of activity is that new baths have been added or enlarged with very little thought given to increasing the rinse tanks. As a result, rinse tanks are heavily overloaded, causing the rinse water to become, in effect, a dilute composite of all the plating and cleaning baths.

Since the amount of drag in or drag out is small, the effect of these unknown water impurities in the baths is not readily noticeable. What usually happens is a decrease in cathode efficiency, a darkening of the plate, and in extreme cases, peeling and blistering or roughening of the plate. Since these progressive changes are very gradual, they are not noticed until the plate is objectionable or the thickness is not to specifications.

The same sort of condition prevails in the burnishing departments where the tubbing barrels have to be frequently taken out of the line and the accumulated sludge scraped off the sides. Most metal finishers are aware that the hardness in the water will deposit an insoluble soap precipitate which sticks to the sides of the tank as well as to the work. However, few finishers, if any, associate the formation of sludge in the alkaline baths or the deteriorated quality of the plate with the presence of the hardness ions—calcium and magnesium—in the water supply.

A series of experiments were devised to prove conclusively (1) how the quality of the water, treated and

untreated, affects the plating bath and cleaning cycle; (2) how insufficient complete changes of water in the rinse tanks or the high solid content of the raw water causes staining, and (3) the effect of burnishing compounds on different types of water. Fig. 1 illustrates an experimental setup used for demineralizing hard water high in solid content.

The question is often asked, "How can we obtain treated water simply and inexpensively?" One method would be to add about 0.5 lb of caustic soda to 100 gal of raw water and when the precipitate has settled decant the clear water to the plating tank. This method, however, is cumbersome and expensive. Another method would be to add sequestering agents which are usually complex phosphates. This again is cumbersome, expensive and inefficient.

Treated water can be obtained inexpensively and simply, without any addition of chemicals to the water, by simply passing the clear raw water through a single, easily regenerated ion exchange bed to obtain soft water, or two or more of these ion exchange beds to obtain water comparable to distilled water.

These two processes, water softening and demineralization of water, are frequently confused because of the similarity of treatment.

Water softening ion exchange material can be one of three types, natural zeolite (greensand mined and processed to yield higher exchange capacity), precipitated gel type of zeolite (corresponds chemically to sodium aluminum silicate), and finally, organic resin type of exchanger materials. The latter possesses the highest exchange value and has the advantage in that it is not readily fouled with iron and can be washed with dilute acids and alkalis which would destroy the first two types of exchange materials mentioned.

All of these three ion exchange materials will take out calcium and magnesium from the raw water and substitute sodium in its place. The presence of calcium and magnesium ion in the raw water determines its hardness. This, then, is the clue to how water softeners operate as an ion exchange medium as shown in the following chemical reactions:

$$\left.\begin{matrix}\text{Calcium}\\ \text{or}\\ \text{Magnesium}\end{matrix}\right\}\ \text{ions} + \text{sodium zeolite} \rightarrow \left.\begin{matrix}\text{calcium}\\ \text{or}\\ \text{magnesium}\end{matrix}\right\}\ \text{zeolite and sodium ions}$$

It will be noted that the total solid content does not decrease. The only change is that the softened water now contains as many more sodium ions as there were calcium and magnesium ions present in the raw water.

When the exchange bed has reached its capacity of calcium and magnesium ions, the bed is regenerated by a simple washing with salt brine solution. The calcium and magnesium ions are washed out as calcium and magnesium salts, leaving the bed in its original condition.

If the same organic resin type of ion exchanger is used and it is washed with dilute sulfuric or hydrochloric acid, the resulting material is what is commonly referred to as hydrogen zeolite. If the water comes in contact with the negative hydrogen ion charged bed, all the positively charged ions present in the water attach themselves to this zeolite and are replaced with hydrogen. Thus, if calcium, magnesium, iron and sodium salts are present in the raw water, they will be removed and will be replaced with hydrogen instead of sodium. The result is the formation of an acid of the salts present in the water. For example, if calcium sulfate is present in raw water, the calcium ion will be removed and by replacing it with hydrogen sulfuric acid is formed as shown by the following reaction:

$$Ca\ So_4 + H_2Z \rightarrow Ca\ Z + H_2So_4$$

Similarly:

$$Mg\ Cl_2 + H_2Z \rightarrow Mg\ Z + 2\ H\ Cl$$

$$Ca\ (HCO_3)_2 + H_2Z \rightarrow Ca\ Z + 2H_2CO_3$$

This is the first step of demineralization which is known as cation exchange. It follows then that another step is necessary to remove the acids from the effluent of this first step. Another organic resin has been developed which will readily adsorb the highly ionized acid solution of hydrochloric and sulfuric acid. This process is the so-called anion exchange. Actually it is an adsorption phenomenon. Carbonic acid, which is a weaker ionized acid, is not readily adsorbed in a two-step exchanger. However, by simple aeration the dissolved CO_2 present can be readily removed.

When the cation exchanger has become exhausted, it is regenerated by passing dilute sulfuric acid through the bed thus reverting the bed back to its original condition. When the anion exchanger is exhausted, it is revivified with dilute soda ash solution.

TABLE I

Effect of Water Treatment on Various Phases of Metal Finishing

The table below shows the effect on various phases of metal finishing when prepared hard water containing calcium bicarbonate, magnesium chloride and magnesium sulfate is softened by passing through a Belcolite ion exchanger and demineralized by passing through an anion and cation exchanger of the Belcolite type.

	Prepared Hard Water	Softened Water	Demineralized Water
(1) Addition of sodium carbonate, sodium cyanide or sodium hydroxide.	Sludge formed	Solution clear	Solution clear
(2) Glass slides washed in a proprietary metal cleaner and rinsed.	Dirty film	Glass sparkled	Glass sparkled
(3) Bright nickel plated samples thoroughly rinsed and dried in an oven.	Plate stained	Plate stained	No staining observed
(4) Proprietary burnishing compounds dissolved in the three waters.	Solution has a blue-gray cast with scum forming on sides of beaker	Solution clear no scum visible	Solution clear no scum visible

In order to prepare samples of hard water a concentration of 500 ppm of calcium bicarbonate was chosen for the first sample and a concentration of 250 ppm of magnesium sulfate and magnesium chloride as a second sample. The concentrations may at first sound extremely high when it is considered that New York City water has a hardness of only 51 ppm. This term means that the total amount of calcium and magnesium ions expressed as calcium carbonate is equal to 51 ppm. However the majority of the plating baths are operated hot; therefore, in the course of an 8-hr day, a 3000 gal plating bath may readily evaporate up to one third of its total volume. The hardness of the calcium and magnesium concentration has now increased by two thirds or 85 ppm and by the end of a week the concentration becomes 221 ppm.

The sample of hard water containing 500 ppm of calcium bicarbonate was prepared by mixing solutions of calcium chloride with sodium bicarbonate and then diluting to the desired strength. The sample containing magnesium chloride and magnesium sulfate was prepared directly from their salts.

Formation of Sludge in Alkaline Baths

The first experiment conducted by Bogue was directed toward the formation of sludge in the alkaline plating bath. A few milliliters of 20 pct sodium hydroxide were added to the prepared hard water samples. An immediate precipitate was noticed in each sample or, in terms of shop talk, a sludge was formed. This is not at all surprising to an engineer engaged in boiler water treatment since the precipitation of scale forming compounds by chemical dosages is an everyday practice in boiler feedwater treatment.

The reactions involved are:

$$2\,NaOH + MgSo_4 \rightarrow Na_2So_4 + Mg(OH)_2$$

$$2\,NaOH + MgCl_2 \rightarrow 2\,NaCl + Mg(OH)_2$$

This accounts for some of the sludge that forms in the hot alkaline bath as well as possibly the cause of rough plate and difficulty in buffing. Precipitation or sludge formation does not usually form when less hard waters are available. However, what does occur is a turbid solution due to the colloidal particles floating in the water. These particles are charged and therefore during electrolysis, cataphoresis takes place and the particles are plated along with the metal being plated.

The same results were observed when sodium cyanide or sodium carbonate was added to the prepared hard water samples. This may well account for some of the sludge formed in hot copper cyanide baths as well as the nodular plate, especially when higher current densities are attempted.

The next investigation involved using the same prepared hard water solution as previously described, but this time a portion of the solution was first softened by passing through a bed of ion exchange resin and another portion demineralized by passing through two ion exchangers operating as an anion and cation exchanger. This time when the reagents cyanide, soda ash and caustic soda were added to the softened or demineralized solutions there was no reaction whatsoever and the solutions remained clear. Fig. 2 illustrates the degree of sludge formation under various conditions.

The next experiment was with the cleaning cycle, as here it was felt was the main cause of peeling and blistering of electroplate. Since it is extremely difficult to observe films on metal surfaces, glass slides were substituted. Several glass slides were cleaned thoroughly in a proprietary metal soap alkaline cleaner and then rinsed in each of the prepared hard water solutions. Upon examining each slide with the unaided eye and then under a 15 power microscope, a film is readily noticed on the glass. This film is undoubtedly the insoluble soap curd formed by the calcium or magnesium present in the water. A more familiar example of this film is seen in bathtubs as the familiar ring around the tub. It is true that in less hard water this film can only be observed under the microscope. However, this may account for some of the rejects on bright nickel plating and plating on aluminum by the zincate method. The sodium zincate process is extremely sensitive to any film present for such a film tends to prevent a perfect bond between the aluminum and the zinc immersion plate.

When the prepared hard water solutions were treated as in the first experiment and used for rinsing the alkaline cleaned glass slides, the parts literally sparkled and no film was noticed even under 15 power lens. This is an indication that soft water, as well as demineralized water, increases the rinsability of parts after alkaline cleaning. This is especially advantageous when racks with many parts are being rinsed. Due to the intricacies of racked parts there is a larger drag in of cleaners. Consequently, with better rinsability there will be no precipitated soap film left on parts. If the parts are to be acid pickled, a more uniform pickle will be obtained and there will be no contamination of the acid pickles from fatty acids. The fatty acids float on top of the acid as a sticky substance. Platers are aware of this condition and skim this material off before placing parts in the pickle solution.

Since very little thought is given to the rinse tanks, it was felt that a study of the rinse water might shed some light on the cause of both staining of the finished plate and contamination of plating baths by the rinses. Accordingly, two 25-gal rinse tanks were constructed, one with an adjustable water inlet to observe any increase in the solid content when the water enters above the water line as compared with an inlet placed at the bottom of the tank. The second tank was a still tank containing approximately 5 gal of the prepared hard water as previously described.

Several steel samples were plated in a bright nickel bath and rinsed in the prepared hard water and then placed in an oven maintained at 180°F. The samples were badly streaked and stained.

Another set of steel samples was plated in a bright nickel bath. One set was rinsed in the prepared softened water, and the remaining samples in the prepared demineralized water and then oven dried as the previous set. The samples rinsed in softened water still showed staining while the samples rinsed in demineralized water did not show any staining.

The conclusion that can be drawn from this experiment would indicate that staining of parts plated from nonalkaline plating baths is not a function of hardness of the rinse water, but rather a function of the total solid content of the rinses that leave a residue (commonly called a water stain) after drying. This theory is borne out in the usual practice of job platers of absorbing the excess water in sawdust to eliminate this water staining as well as to facilitate drying.

In order to obtain rapid determinations of the variation in solid content of rinse waters during rinsing

operations, it was necessary to construct a portable apparatus for measuring the conductance of the water and then converting to solid content in grains per gallon (1 grain = 17.1 ppm). Accordingly, such a unit was constructed using a solu-bridge controller mounted in a light case and connected to a relay which actuated colored lights when the solid content increased or decreased from the original reading. A sketch of this instrument is shown in fig. 3. Results of these tests were quite revealing in that the solid content of the rinses increased tremendously when plated parts were plunged into the rinses and the solid content did not return to its original value (city water having a solid content of 5 grains per gal was used for these tests), until an amount of water had been introduced in considerable excess to the volume of water present in the rinse tank. This volume of water was the least when the water inlet was located at the bottom of the rinse and the spillway at the topmost edge.

This test proved a point which the author has long believed—that most rinse tanks are not designed but rather just built. For most efficient rinsing with the present water supply it would be better to have smaller rinse tanks and more of them than large rinse tanks with comparatively small inlet line and a correspondingly small outlet pipe. These rinse tanks should be constructed with the inlet on the bottom and a dam type spillway along the entire edge of the long side of the rinse tank. If staining persists after thorough rinsing, then demineralized water can be used in a second rinse tank, thereby obtaining an economy in the size of the demineralizer needed, as the price of the demineralizer for a fixed water supply is governed by the amount of water needed. If a spray rinse with a foot valve control is substituted for this second rinse, a still greater economy will be obtained in demineralized water requirements.

If the total solid content of the rinse could be made visible, as is the case of the rinses after chromium plating, the plater would be more concerned, as very few platers will rinse parts to be plated in baths other than chromium in the chromium plating rinse tanks. It is unfortunate that an increase in other rinse water impurities in plating baths is not as immediately observed as are traces of chromium salts in cadmium or zinc cyanide plating baths.

The final experiment was conducted with burnishing compounds. In this field real research has been done in preparing burnishing compounds for all types of water. However, those types which contain sequestering agents do not permanently soften water as tests using the standard A.P.H.A. soap test method revealed. The action of a sequestering agent appears to only delay the reaction of the calcium and magnesium with the soap and this time varied from a few minutes to several hours depending on the sequestering agent and the burnishing compound. Without adding a sequestering agent to the burnishing compounds, a larger quantity of burnishing compound is required to obtain suds while the amount of sticky soap curd formed varies with the hardness of the water.

A proprietary burnishing compound was added to the samples of prepared hard water. When enough burnishing compound has been added to produce suds when the test bottles were shaken, a dull gray solution would be obtained with scum adhering to the sides of the test bottles.

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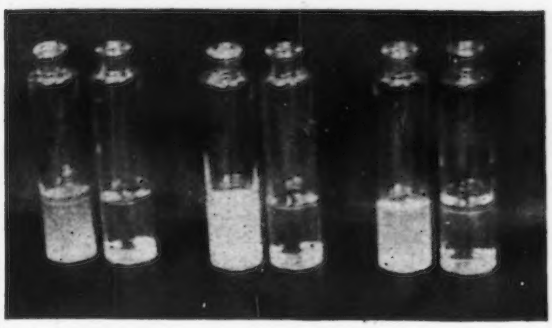

ABOVE

FIG. 2—Sludge formation in hard water and in softened water resulting from the following additions, (left to right) sodium carbonate, sodium hydroxide, and sodium cyanide. In each set of test bottles, the one on the right contains the conditioned water.

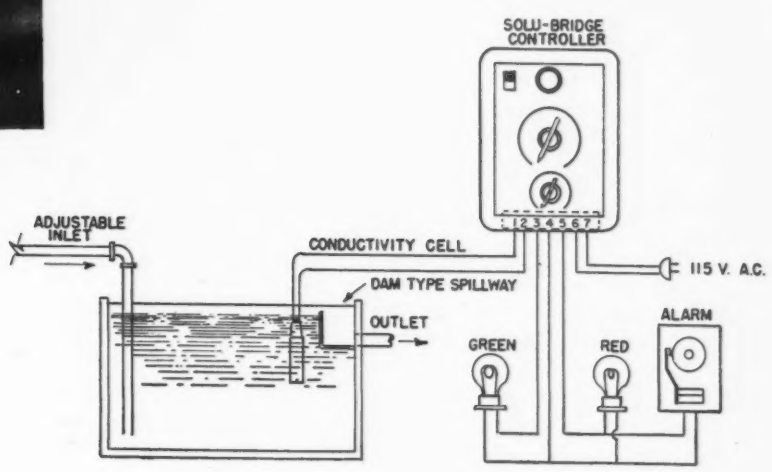

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FIG. 3—Sketch of rinse tank arrangement used for measuring variation in solid content of rinse waters.

In order to prepare samples of hard water a concentration of 500 ppm of calcium bicarbonate was chosen for the first sample and a concentration of 250 ppm of magnesium sulfate and magnesium chloride as a second sample. The concentrations may at first sound extremely high when it is considered that New York City water has a hardness of only 51 ppm. This term means that the total amount of calcium and magnesium ions expressed as calcium carbonate is equal to 51 ppm. However the majority of the plating baths are operated hot; therefore, in the course of an 8-hr day, a 3000 gal plating bath may readily evaporate up to one third of its total volume. The hardness of the calcium and magnesium concentration has now increased by two thirds or 85 ppm and by the end of a week the concentration becomes 221 ppm.

The sample of hard water containing 500 ppm of calcium bicarbonate was prepared by mixing solutions of calcium chloride with sodium bicarbonate and then diluting to the desired strength. The sample containing magnesium chloride and magnesium sulfate was prepared directly from their salts.

Formation of Sludge in Alkaline Baths

The first experiment conducted by Bogue was directed toward the formation of sludge in the alkaline plating bath. A few milliliters of 20 pct sodium hydroxide were added to the prepared hard water samples. An immediate precipitate was noticed in each sample or, in terms of shop talk, a sludge was formed. This is not at all surprising to an engineer engaged in boiler water treatment since the precipitation of scale forming compounds by chemical dosages is an everyday practice in boiler feedwater treatment.

The reactions involved are:

$$2\,NaOH + MgSo_4 \rightarrow Na_2So_4 + Mg(OH)_2$$

$$2\,NaOH + MgCl_2 \rightarrow 2\,NaCl + Mg(OH)_2$$

This accounts for some of the sludge that forms in the hot alkaline bath as well as possibly the cause of rough plate and difficulty in buffing. Precipitation or sludge formation does not usually form when less hard waters are available. However, what does occur is a turbid solution due to the colloidal particles floating in the water. These particles are charged and therefore during electrolysis, cataphoresis takes place and the particles are plated along with the metal being plated.

The same results were observed when sodium cyanide or sodium carbonate was added to the prepared hard water samples. This may well account for some of the sludge formed in hot copper cyanide baths as well as the nodular plate, especially when higher current densities are attempted.

The next investigation involved using the same prepared hard water solution as previously described, but this time a portion of the solution was first softened by passing through a bed of ion exchange resin and another portion demineralized by passing through two ion exchangers operating as an anion and cation exchanger. This time when the reagents cyanide, soda ash and caustic soda were added to the softened or demineralized solutions there was no reaction whatsoever and the solutions remained clear. Fig. 2 illustrates the degree of sludge formation under various conditions.

The next experiment was with the cleaning cycle, as here it was felt was the main cause of peeling and blistering of electroplate. Since it is extremely difficult to observe films on metal surfaces, glass slides were substituted. Several glass slides were cleaned thoroughly in a proprietary metal soap alkaline cleaner and then rinsed in each of the prepared hard water solutions. Upon examining each slide with the unaided eye and then under a 15 power microscope, a film is readily noticed on the glass. This film is undoubtedly the insoluble soap curd formed by the calcium or magnesium present in the water. A more familiar example of this film is seen in bathtubs as the familiar ring around the tub. It is true that in less hard water this film can only be observed under the microscope. However, this may account for some of the rejects on bright nickel plating and plating on aluminum by the zincate method. The sodium zincate process is extremely sensitive to any film present for such a film tends to prevent a perfect bond between the aluminum and the zinc immersion plate.

When the prepared hard water solutions were treated as in the first experiment and used for rinsing the alkaline cleaned glass slides, the parts literally sparkled and no film was noticed even under 15 power lens. This is an indication that soft water, as well as demineralized water, increases the rinsability of parts after alkaline cleaning. This is especially advantageous when racks with many parts are being rinsed. Due to the intricacies of racked parts there is a larger drag in of cleaners. Consequently, with better rinsability there will be no precipitated soap film left on parts. If the parts are to be acid pickled, a more uniform pickle will be obtained and there will be no contamination of the acid pickles from fatty acids. The fatty acids float on top of the acid as a sticky substance. Platers are aware of this condition and skim this material off before placing parts in the pickle solution.

Since very little thought is given to the rinse tanks, it was felt that a study of the rinse water might shed some light on the cause of both staining of the finished plate and contamination of plating baths by the rinses. Accordingly, two 25-gal rinse tanks were constructed, one with an adjustable water inlet to observe any increase in the solid content when the water enters above the water line as compared with an inlet placed at the bottom of the tank. The second tank was a still tank containing approximately 5 gal of the prepared hard water as previously described.

Several steel samples were plated in a bright nickel bath and rinsed in the prepared hard water and then placed in an oven maintained at 180°F. The samples were badly streaked and stained.

Another set of steel samples was plated in a bright nickel bath. One set was rinsed in the prepared softened water, and the remaining samples in the prepared demineralized water and then oven dried as the previous set. The samples rinsed in softened water still showed staining while the samples rinsed in demineralized water did not show any staining.

The conclusion that can be drawn from this experiment would indicate that staining of parts plated from nonalkaline plating baths is not a function of hardness of the rinse water, but rather a function of the total solid content of the rinses that leave a residue (commonly called a water stain) after drying. This theory is borne out in the usual practice of job platers of absorbing the excess water in sawdust to eliminate this water staining as well as to facilitate drying.

In order to obtain rapid determinations of the variation in solid content of rinse waters during rinsing

operations, it was necessary to construct a portable apparatus for measuring the conductance of the water and then converting to solid content in grains per gallon (1 grain = 17.1 ppm). Accordingly, such a unit was constructed using a solu-bridge controller mounted in a light case and connected to a relay which actuated colored lights when the solid content increased or decreased from the original reading. A sketch of this instrument is shown in fig. 3. Results of these tests were quite revealing in that the solid content of the rinses increased tremendously when plated parts were plunged into the rinses and the solid content did not return to its original value (city water having a solid content of 5 grains per gal was used for these tests), until an amount of water had been introduced in considerable excess to the volume of water present in the rinse tank. This volume of water was the least when the water inlet was located at the bottom of the rinse and the spillway at the topmost edge.

This test proved a point which the author has long believed—that most rinse tanks are not designed but rather just built. For most efficient rinsing with the present water supply it would be better to have smaller rinse tanks and more of them than large rinse tanks with comparatively small inlet line and a correspondingly small outlet pipe. These rinse tanks should be constructed with the inlet on the bottom and a dam type spillway along the entire edge of the long side of the rinse tank. If staining persists after thorough rinsing, then demineralized water can be used in a second rinse tank, thereby obtaining an economy in the size of the demineralizer needed, as the price of the demineralizer for a fixed water supply is governed by the amount of water needed. If a spray rinse with a foot valve control is substituted for this second rinse, a still greater economy will be obtained in demineralized water requirements.

If the total solid content of the rinse could be made visible, as is the case of the rinses after chromium plating, the plater would be more concerned, as very few platers will rinse parts to be plated in baths other than chromium in the chromium plating rinse tanks. It is unfortunate that an increase in other rinse water impurities in plating baths is not as immediately observed as are traces of chromium salts in cadmium or zinc cyanide plating baths.

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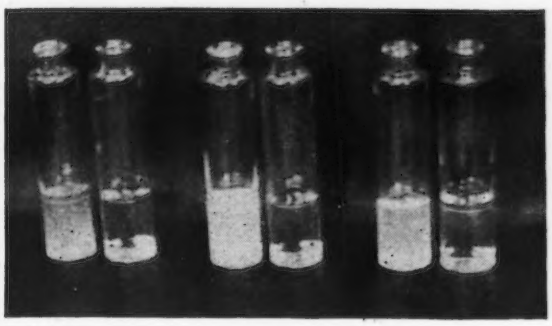

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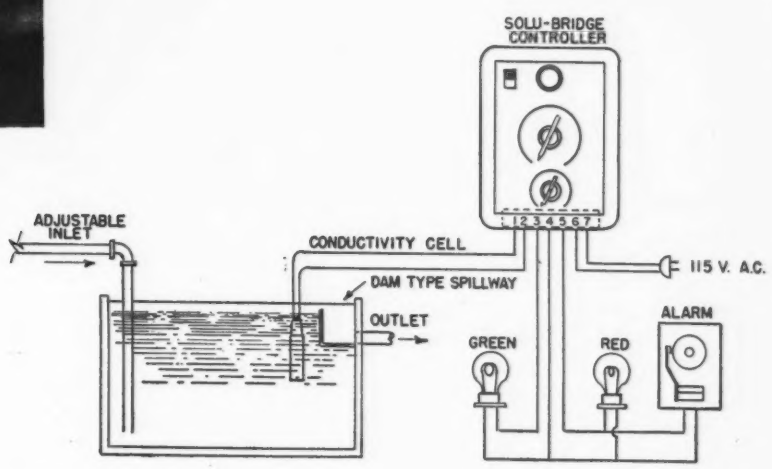

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article and summarized in table 1, indicate that softened water rinses would be ideal after alkaline cleaning to provide not only parts free of soap films but would prolong the life of the pickling baths by eliminating drag in of alkali and enable more uniform pickling with a resultant increase in adhesion of plated parts. This practice is especially notable in plating on aluminum by the zincate method.

This same softened water would eliminate sludge in the hot alkaline plating baths formed by the precipitation of calcium and magnesium salts present in hard water on the addition of necessary plating chemicals, such as soda ash, cyanide and caustic soda. Parts burnished with soap-type burnishing compounds in softened water will have a brilliance not obtainable when hard water is used, due to the absence of dull soap films. An ease of rinsing and an economy in burnishing compound will also be realized.

The advantages of demineralized water has not been brought out in these experiments. It has been shown that the staining of bright nickel plated parts was eliminated by removing the solids present in rinse water with a demineralizer. The real advantages obtained, besides those realized with softened water, are brighter and more easily buffed deposits when demineralized water is used for preparing plating solutions as well as for rinses and all make up water. Higher temperatures with higher current densities can be used successfully without rough nodular deposits.

It should be stressed that water conditioning is not a panacea for plating difficulties. Good plating procedures must still be practiced, but the higher quality and larger production resulting from the use of treated water is a tool that metal finishers can profitably investigate.

Air Operated Eccentric Fixture Simplifies Broaching

TO eliminate the necessity of manual broach handling and to simplify the broaching of keyway slots in the bores of heavy duty steering knuckles, an ingenious fixture operating mechanism has been designed by Colonial Broach Co., Inc., Detroit. This mechanism also eliminates the necessity of loading the part over the broach, thus reducing effort on the part of the operator. The machine is a 10-ton Colonial utility hydraulic press, equipped with a standard Colonial pull-down broaching attachment.

The fixture operates as follows: With the broach in the down position, the finished part is removed and an unbroached knuckle is placed on the fixture. The short handle shown at the extreme left of the machine is pulled back. This causes the air cylinder to retract the fixture into the position shown in fig. 1. Actually the cylinder both raises the fixture and moves it slightly toward the operator by means of the eccentric cam shown at the right of the fixture.

In this position, the slotting broach can return through the bore of the part without dragging. At the top of the return stroke, the lever is pushed forward and the air cylinder returns the fixture to the position shown in fig. 2. The broach is now pulled down through the bore, cutting the keyway slot. At the end of the stroke the part is removed, another inserted, and the cycle repeats.

The second bore is broached in a similar manner. After the first bore has been broached in a run of parts, the fixture is indexed to position for the second bore. The locating pads, etc., on the fixture for this second operation are shown in back of the pull-down attachment guide rods. An idea of the size of this knuckle is given by the close-ups, in comparison with the pull-down attachment guide rods for this 10-ton machine.

FIG. 1—By raising the fixture into this position—pulled away from the broach—the tool can be returned through the bore of an unbroached part without dragging.

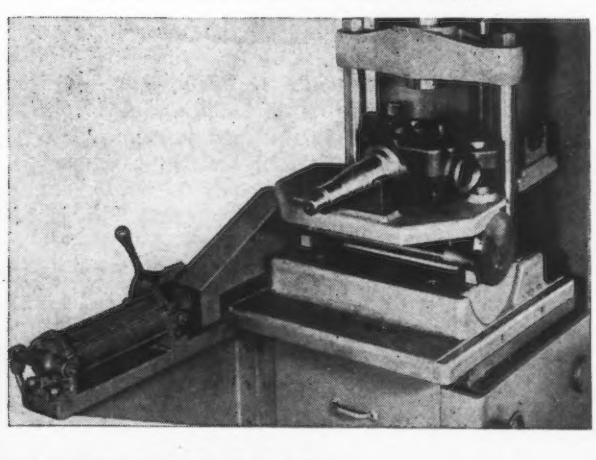
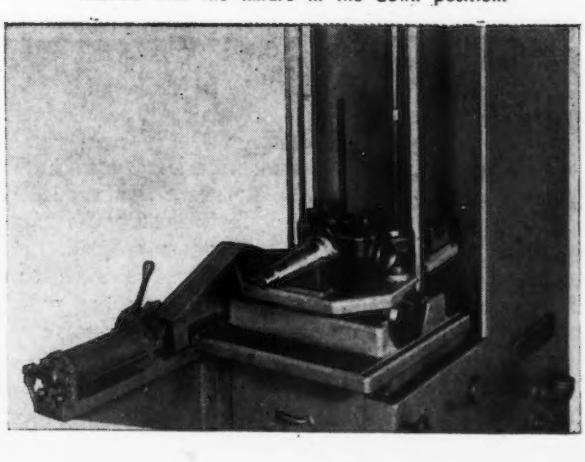


FIG. 2—Broaching the keyway in one bore of a steering knuckle with the fixture in the down position.



• W. B. PEIRCE Pittsburgh, new national ASTE president.

Tool Engineers Convene in Houston

Presenting one of the finest technical programs of its career, the American Society of Tool Engineers, holding its 15th annual convention in Houston, continued to emphasize the necessity for increased production, and continues its theme of more goods for more people at lower prices, while paying higher wages.

UNDER blue skies and in warm spring weather some 500 members of the American Society of Tool Engineers gathered in Houston for the Society's 15th annual convention, held at the Rice Hotel, March 19 through 22. Despite the fact that there was no tool show to act as a drawing card, and regardless of the distance that many of them had to cover, members and guests were present from nearly every one of the society's 76 chapters, scattered through almost every state and Canada. Some, perhaps, were attracted by the lure of Texas itself and others by the opportunity of getting a brief foretaste of spring after the long weeks of snow and ice that have plagued at least the northern part of the country. But undoubtedly the majority were prompted by the outstanding character of the technical papers presented.

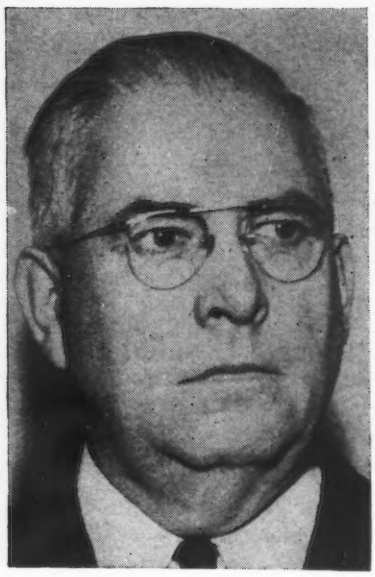
Planned to cover the broadest possible field of interest, and to appeal to members in all branches of industry, the technical sessions nevertheless managed to acquire a somewhat western flavor by including subjects referring specifically to the Southwest's greatest industry—oil. This in itself gave evidence of the fact that tool engineering is by no means confined to the more obvious mechanical industries, but finds wide application in every field where quantity production and the quality of product is of major importance.

The first technical session held on Wednesday afternoon dealt with crushed and diamond dressing of grinding wheels, and was keynoted by Frank J. Tone, Jr., vice-president, Carborundum Co. and son of one of the founders of that organization. Taking as his subject the history, development and progress of the abrasive industry, Tone briefly outlined the major steps in the development of grinding from the coarse natural sandstone, through the discovery of silicon carbide, to the present highly refined abrasives manufactured under the most exact scientific control and capable of almost infinite variation to suit the needs of specific applications in every branch of modern industry.

The abrasive industry, he declared, can no more stand still than can industry in general, and to meet the ever changing conditions and the continued introduction of new industrial materials, abrasive manufacturers must not merely keep abreast of, but must frequently be ahead of industry.

Supporting Mr. Tone was D. H. Currie, abrasive engineer, Carborundum Co., who discussed crushed dressing of grinding wheels. Although this technique has been known for many years it is only recently that it has come into practical use on a large scale, and it has been necessary to do a considerable amount of careful research to determine the most suitable method of performing this, and to develop grinding wheels specifically adapted to forming by crushed dressing. One of the most important factors in crushing, Currie explained, is the use of grinding oil rather than water soluble compounds, and the flooding of the work from both above and below.

The third speaker in this symposium, E. V. Flanders, chief engineer, Thread Grinding Division, Jones & Lamson Machine Co., discussed the practical application of both crushed and diamond dressing with particular reference to thread grinding. Briefly tracing the development of thread grinding, Flanders pointed out the significance of the introduction of the resinoid bonded wheel, and the multi-rib technique of grinding. Although these wheels can be crush dressed, he explained, the time required and the excessive wear on the crusher rolls makes it impractical, and he recommended that crushing be confined to vitrified wheels.



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Making a careful and completely unbiased survey of both crushed and diamond dressing, he concluded that at the present stage of development diamond dressing was still preferable in thread grinding work.

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Rarely has this writer seen a technical audience so enthused, and the flood of written questions Lincoln was called upon to answer gave witness of the intense interest felt by both employers and employees. Anwering several questioners, he emphasized that no one particular incentive plan can be regarded as best, but that if any given plan, no matter what it may be, is found fully acceptable to both sides, then that plan will work, and as far as its participants are concerned, that is the best plan.

Appealing not only to those engaged in the oil industry, but also to tool engineers in general, the session held on Thursday morning was presented by A. A. Nichoson and W. C. Lockwood, respectively, assistant to the vice-president and engineer specialist, the Texas Co. Under the title of The Tool Engineer Looks at Oil, this program gave a comprehensive view of the oil industry and was illustrated by two motion pictures, "Deep Horizons" and "Masters of Molecules."

The afternoon session was devoted to two of the new but extremely important industries that have lately entered the Southwest, namely, magnesium and plastics. Keynote speaker N. D. Griswold, assistant general manager, Texas div., Dow Chemical Co., Freeport, Texas, broadly outlined the main subject, and was ably followed by three speakers from Dow Chemi-Co., Midland, Mich. Gordon B. Thayer discussed plastics materials and fabricating methods; A. M. Lennie dealt with the machining of magnesium; and C. E. Lenhardt handled the section dealing with magnesium fabrication and assembly practices.

As is customary at all ASTE conventions, one session was devoted to the field of education. This was held on Thursday night. Due to adverse weather conditions en route, two of the scheduled speakers were unable to attend, and the opening address was delivered by Guy Hubbard, machine tool editor of *Steel*, who spoke on the history of engineering and outlined the succession of obstacles that had to be overcome before engineering obtained the recognition and dignity of an accepted profession. Starting with the civil engineers, each engineering society, ASME, SAE, and so on, had to overcome the opposition of older groups, and he reminded the audience that ASTE was now in the same condition as each of the societies had been in turn.

Herbert D. Hall, national program committee chairman, delivered the address originally prepared by W. D. Merrifield, Chrysler Corp., on "What Industry Expects in the Development of Tool Engineers." The final speaker, Dr. W. R. Woolrich, dean of engineering, University of Texas, concluded the program with a timely discussion on what education can do in the development of tool engineers.

Oil was again in the foreground at the first session on Friday, when a paper on the manufacture and use of geophysical instruments was presented by J. H. Dunaway, senior research geophysicist, Humble Oil Co., Houston. Jointly prepared by the speaker and Messrs. A. Bary, design engineer, S. E. Swain, shop superintendent, and D. W. Blair, gravity shop foreman, this discussion centered around modern methods of prospecting for oil, and described the instruments used for this purpose. Information was also given on the methods used in the production of this precision equipment.

On the same program, I. K. Fussell, production engi-

neer, Schlumberger Well Surveying Corp., Houston, gave an interesting talk on precision instruments used in oil well surveying.

Always of interest to tool engineers, cemented carbides were discussed on Friday afternoon by Philip M. McKenna and W. L. Kennicott, president and chief engineer respectively of Kennametal Inc., Latrobe, Pa. Under the title of "Principles of Design for Carbides and Some Unusual Applications, the speakers described the metallurgy and preparation of cemented carbides, their use as cutting tools and their application to fields other than metal cutting. A brief digest of McKenna's talk is presented elsewhere in this report.

The final technical session was concerned with valve and meter manufacture and featured an address by Col. W. F. Rockwell, president, Rockwell Mfg. Co., Pittsburgh, on the subject of the tool engineer's place in the world. He was ably seconded by A. E. McIntyre, general manager, Pittsburgh Equitable Meter Div., Rockwell Mfg. Co., who discussed the place and importance of tool engineering in the manufacture of valves and meters.

Concluding event in the official convention program was the installation of new national officers. This took place during a brief ceremony on Friday night, since the customary banquet was dispensed with in view if the barbeque and rodeo held on Saturday afternoon.

New national president for the year 1947-48 is W. B. Peirce, vice president, Flannery Bolt Co., Pittsburgh, succeeding A. M. Sargent. The office of 1st vice president, formerly held by Peirce, is now filled by Irwin F. Holland, general superintendent, small tool and gage div., Pratt & Whitney Div., Niles, Bement, Pond Co., Hartford, while P. B. Douglas, works mgr., Propeller Div., Canadian Car & Foundry Co., Ltd., Montreal, was named 2nd vice president.

George Johnson, chief engineer, Barnes Drill Co., Rockford, was elected to the office of 3rd vice president, and W. A. Dawson, branch mgr., F. F. Barber Machinery Co., Hamilton, Ont., Canada, became national secretary. The post of treasurer went to V. H. Johnson, vice president, Johnson de Vore, Inc., Boston, who held the office last year. Harry E. Conrad was re-elected executive secretary of the society.

NEW ASTE president W. B. "Brad" Peirce, left, talks things over with retiring president "Al" Sargent.

Incentives and Enterprise

By J. F. LINCOLN
President, Lincoln Electric Co., Cleveland

WE are in a new era in labor relations. This has been evident for some time. The old method of control, in which the relationship of master and man was real in the minds of both labor and management, has disappeared.

Not only have we removed the domination of management over the worker, but we also have set up unemployment insurance so the worker does not need to work any more. He will be supported by the state without working, practically speaking, as long as he wishes. While this arrangement may sound funny to the average individual, it is extremely popular with the majority of voters, hence, it is not going to disappear in a democracy.

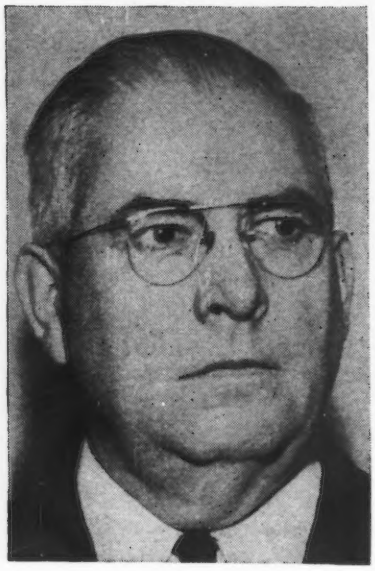
Because of the fact that management has no control over the worker, the efficiency of production has gone down to a startling extent and cannot increase until the worker changes his present attitude of output limitation. Therefore, he must look forward to a lower and lower standard of living under the present domination of union labor leadership.

There is very little doubt in the mind of any one who will look at the present situation objectively that the theory that collective bargaining would eliminate all of the difficulties between labor and management has completely and entirely failed. There is no such thing as collective bargaining, there is merely the domination of labor and the collecting of anything that labor insists it wants from the consumer, as we now are seeing.

If we are to mend the present situation, a whole new approach is necessary to our problem. Since we cannot force the worker to work by any device now left in the hands of management, we must find a way of making the worker change his attitude. Since we cannot command, we must make him a part of the team of management and men. We call that Incentive Management. The result is the same no matter what it is called if the worker wants to produce. There is no other way out. If we can get that point of view into the worker's mind and the worker desires to produce at top speed, we not only get the results which we had before when the fear of losing the job was a driving force, but we also get an additional setup in efficiency when the worker desires to do a better and better job.

We cannot continue the chaos of collective bargaining with its war and destruction. That will mean the disappearance of our economy and inevitably lead to totalitarianism.

It has been said that totalitarianism is an efficient form of government. Perhaps that is so. On the other hand, it has always been true that the repre-



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The afternoon session was devoted to two of the new but extremely important industries that have lately entered the Southwest, namely, magnesium and plastics. Keynote speaker N. D. Griswold, assistant general manager, Texas div., Dow Chemical Co., Freeport, Texas, broadly outlined the main subject, and was ably followed by three speakers from Dow Chemi-Co., Midland, Mich. Gordon B. Thayer discussed plastics materials and fabricating methods; A. M. Lennie dealt with the machining of magnesium; and C. E. Lenhardt handled the section dealing with magnesium fabrication and assembly practices.

As is customary at all ASTE conventions, one session was devoted to the field of education. This was held on Thursday night. Due to adverse weather conditions en route, two of the scheduled speakers were unable to attend, and the opening address was delivered by Guy Hubbard, machine tool editor of *Steel*, who spoke on the history of engineering and outlined the succession of obstacles that had to be overcome before engineering obtained the recognition and dignity of an accepted profession. Starting with the civil engineers, each engineering society, ASME, SAE, and so on, had to overcome the opposition of older groups, and he reminded the audience that ASTE was now in the same condition as each of the societies had been in turn.

Herbert D. Hall, national program committee chairman, delivered the address originally prepared by W. D. Merrifield, Chrysler Corp., on "What Industry Expects in the Development of Tool Engineers." The final speaker, Dr. W. R. Woolrich, dean of engineering, University of Texas, concluded the program with a timely discussion on what education can do in the development of tool engineers.

Oil was again in the foreground at the first session on Friday, when a paper on the manufacture and use of geophysical instruments was presented by J. H. Dunaway, senior research geophysicist, Humble Oil Co., Houston. Jointly prepared by the speaker and Messrs. A. Bary, design engineer, S. E. Swain, shop superintendent, and D. W. Blair, gravity shop foreman, this discussion centered around modern methods of prospecting for oil, and described the instruments used for this purpose. Information was also given on the methods used in the production of this precision equipment.

On the same program, I. K. Fussell, production engi-

neer, Schlumberger Well Surveying Corp., Houston, gave an interesting talk on precision instruments used in oil well surveying.

Always of interest to tool engineers, cemented carbides were discussed on Friday afternoon by Philip M. McKenna and W. L. Kennicott, president and chief engineer respectively of Kennametal Inc., Latrobe, Pa. Under the title of "Principles of Design for Carbides and Some Unusual Applications, the speakers described the metallurgy and preparation of cemented carbides, their use as cutting tools and their application to fields other than metal cutting. A brief digest of McKenna's talk is presented elsewhere in this report.

The final technical session was concerned with valve and meter manufacture and featured an address by Col. W. F. Rockwell, president, Rockwell Mfg. Co., Pittsburgh, on the subject of the tool engineer's place in the world. He was ably seconded by A. E. McIntyre, general manager, Pittsburgh Equitable Meter Div., Rockwell Mfg. Co., who discussed the place and importance of tool engineering in the manufacture of valves and meters.

Concluding event in the official convention program was the installation of new national officers. This took place during a brief ceremony on Friday night, since the customary banquet was dispensed with in view if the barbeque and rodeo held on Saturday afternoon.

New national president for the year 1947-48 is W. B. Peirce, vice president, Flannery Bolt Co., Pittsburgh, succeeding A. M. Sargent. The office of 1st vice president, formerly held by Peirce, is now filled by Irwin F. Holland, general superintendent, small tool and gage div., Pratt & Whitney Div., Niles, Bement, Pond Co., Hartford, while P. B. Douglas, works mgr., Propeller Div., Canadian Car & Foundry Co., Ltd., Montreal, was named 2nd vice president.

NEW ASTE president W. B. "Brad" Peirce, left, talks things over with retiring president "Al" Sargent.

George Johnson, chief engineer, Barnes Drill Co., Rockford, was elected to the office of 3rd vice president, and W. A. Dawson, branch mgr., F. F. Barber Machinery Co., Hamilton, Ont., Canada, became national secretary. The post of treasurer went to V. H. Johnson, vice president, Johnson de Vore, Inc., Boston, who held the office last year. Harry E. Conrad was re-elected executive secretary of the society.

Incentives and Enterprise

By J. F. LINCOLN
President, Lincoln Electric Co., Cleveland

WE are in a new era in labor relations. This has been evident for some time. The old method of control, in which the relationship of master and man was real in the minds of both labor and management, has disappeared.

Not only have we removed the domination of management over the worker, but we also have set up unemployment insurance so the worker does not need to work any more. He will be supported by the state without working, practically speaking, as long as he wishes. While this arrangement may sound funny to the average individual, it is extremely popular with the majority of voters, hence, it is not going to disappear in a democracy.

Because of the fact that management has no control over the worker, the efficiency of production has gone down to a startling extent and cannot increase until the worker changes his present attitude of output limitation. Therefore, he must look forward to a lower and lower standard of living under the present domination of union labor leadership.

There is very little doubt in the mind of any one who will look at the present situation objectively that the theory that collective bargaining would eliminate all of the difficulties between labor and management has completely and entirely failed. There is no such thing as collective bargaining, there is merely the domination of labor and the collecting of anything that labor insists it wants from the consumer, as we now are seeing.

If we are to mend the present situation, a whole new approach is necessary to our problem. Since we cannot force the worker to work by any device now left in the hands of management, we must find a way of making the worker change his attitude. Since we cannot command, we must make him a part of the team of management and men. We call that Incentive Management. The result is the same no matter what it is called if the worker wants to produce. There is no other way out. If we can get that point of view into the worker's mind and the worker desires to produce at top speed, we not only get the results which we had before when the fear of losing the job was a driving force, but we also get an additional setup in efficiency when the worker desires to do a better and better job.

We cannot continue the chaos of collective bargaining with its war and destruction. That will mean the disappearance of our economy and inevitably lead to totalitarianism.

It has been said that totalitarianism is an efficient form of government. Perhaps that is so. On the other hand, it has always been true that the repre-

sentative form of government, such as we have in the United States, is extremely clumsy when it comes to executive operation. That is the safeguard against government infringement upon the liberties of those governed. It is the reason why the individual has retained his freedom. People today, however, are attempting to have government control everyone's destiny. People are looking to government to give social security, to give jobs, to take care of each individual in old age, to take care of everyone in sickness and accident, to assure that everyone can prosper at their jobs, that each one's income shall be sufficient, and the cost of living controlled. Government is asked to build homes, to educate children, and to control their number.

Any one who will review the facts as demonstrated by history knows without doubt the impossibility of accomplishing this purpose by government. If the failure to reach this desired end were the only outcome of our attempt there would be not too much to worry about and we would learn our lesson and go on from there. However, this cannot possibly be the outcome.

As government is given more responsibility, it must change from a representative form to a totalitarian form since only so can these responsibilities be assumed. We have gone a long distance in that direction. There is very little doubt that more than 50 billion dollars will be spent in the next 12 months for the government of the people of the United States, including national, state and local. There is no doubt this will be the strongest influence in the life of every individual. That it can be controlled by the unorganized individual, as government spending has been controlled heretofore, is, of course, impossible. Therefore, we can be sure there will be some form of totalitarianism within a comparatively few years.

There is still another reason why this must come as long as we depend on government for our livelihood. In a representative form of government, it is impossible for the acts of the representatives to rise above the knowledge and mentality of the average voter. Since this knowledge obviously would be far below that needed to produce the results that these same voters call on government to produce, it is obvious they must relinquish any form of control upon government. Only so can any attempt toward producing an assured living be given by government.

It is also obvious that if the average American recognized what the future must be with his present philosophy, he would resist it to the end. No American wants to lose his freedom. Therefore, the hopeful aspect of the situation is that after we have had totalitarianism for a period of one or more generations there will undoubtedly be a revolution which will bring back the freedom which we are now sacrificing. That this period of regress is imminent is disturbing, but history shows that it is only so that progress has been made.

Principles of Design for Carbides and Some Unusual Applications

WHEN a fundamentally new material becomes available to engineers, designers, inventors and shop men for the construction of appliances, tools and machine parts, it takes some time before the principles by which it may be effectively applied become generally understood.

The first commercial application of carbides in the U. S. was in the manufacture of wire drawing dies, and this was quickly followed by its use as tool tips in the machining of cast iron, bronze and aluminum in which a crumbled type of chip was produced. So phenomenally successful were these applications that even at the then current price of $400.00 per lb, many jobs could be performed more economically than with other types of tools. For the cutting of steel, however, these early carbides were not so successful due to their tendency to crater and to their lack of strength to resist the greater forces encountered. In 1939 less than 30 pct of all cemented carbide tools produced in the U. S. A. were used for the machining of steel, while by the close of 1942, 80 pct were used for this purpose. This was accomplished by the introduction of new types of material containing tantalum, titanium or columbium carbide.

The new material, tungsten titanium carbide, was

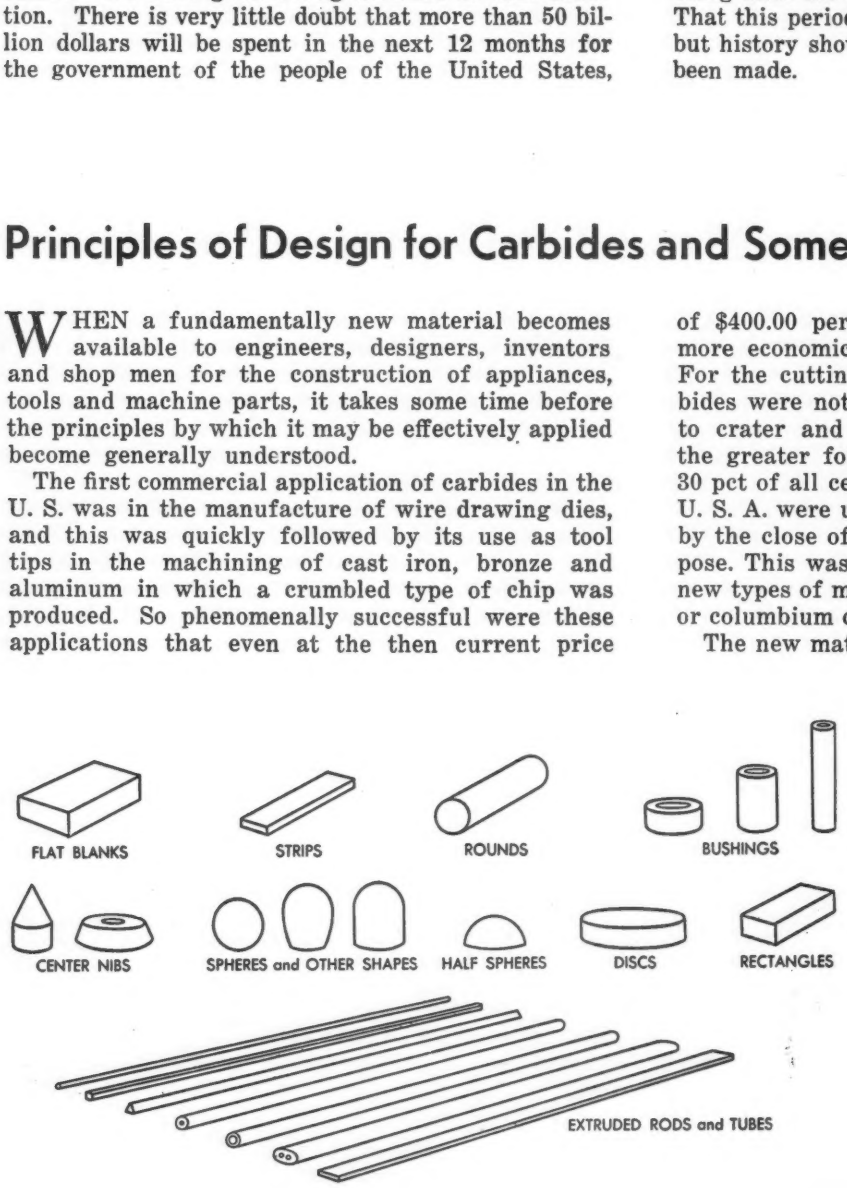


FIG. 1—Typical simple shapes for carbide parts made by pill pressing and extrusion.

FIG. 2 — Complex carbide shapes formed by mechanical operations on pressed slugs in either the unsintered or partially sintered state.

introduced in 1937. Isolated by a unique process, crystals of this material are harder than tungsten carbide and have proved entirely suitable for machining steel, not only resisting cratering, but possessing high transverse rupture strength.

To the designer it is important to know what shapes and sizes of pieces he may obtain to suit his needs. The shapes most widely supplied are those for tool tips, generally rectangular prisms having a base with four sides rising at right angles to the base, so that the pieces may be produced in pill presses or tabletting machines. To be producible in tabletting machines the contour of the base must be the same as the contour of the opposing top surface although the contour may be and often is other than that of a rectangle; for example, one of the corners generally has a large radius to facilitate seating the tip in a recess milled in a tool shank. Disks may similarly be produced in tabletting machines.

Pressures of 20,000 to 40,000 psi are required to compact the powder so that limitations as to area in available tabletting machines is about 2 sq in. The thickness of powder which may be effectively pressed in such devices is also limited, and in general is less than ¾ in. in thickness. The plastic flow in such powders is practically nothing laterally so that shapes which do not have the side walls at right angles to the base cannot be successfully pill pressed. When, for example, a side surface at 84° to the base, instead of 90° is wanted, as in providing a clearance on a cutting tool tip, the blank or powder compact is made first with 90° walls and the 6° clearance then formed by holding the end of a blank in a jig, against the rotating flat side of an abrasive wheel. While in the unsintered state, the material may be readily formed by grinding with a silicon carbide wheel, the pressed powder having about the consistency of chalk, although of course the particles are highly abrasive. Another shape which is generally made on tabletting machines is that of washers, that is small rings sometimes used for valve seats in oil pumps, a cored ram being used in the tabletting machine. The accuracy with which these shapes may be made completely sintered is about 1 pct lineally. The percentage of lineal shrinkage is generally about 16 pct but varies somewhat. Shrinkage fortunately takes place equally in all directions so that if a piece of pressed powder is made about 20 pct bigger in all dimensions than desired, it comes out of the sintering furnace the size and shape wanted with very little distortion.

For the making of pieces which cannot be formed in tabletting machines slugs of pressed powder may be made up in heavy presses and from these slugs articles may be formed by grinding or by cutting in small machine tools such as lathes using diamond tools or small grinding wheels. In cases where the fragility of the pressed powder shape is such as would cause it to break or crumble while worked, the slug or roughly formed piece may be presintered before working to strengthen it, that is by heating it to 800 ° to 1100° C in hydrogen or a vacuum; although it does not shrink more than a fraction of 1 pct it becomes a little stronger.

Still a third way in which cemented hard compositions may be produced in desirable forms is by extrusion of the powder with admixture of suitable lubricants. Rods, tubes and shapes having uniform cross sections and of small sizes may be made in this way in certain straight tungsten carbide grades which are capable of extrusion. Fig. 1 shows typical rough molded shapes made by pill pressing, or by extrusion having uniform cross sections or readily altered from such cross sections by grinding, while fig. 2 shows a number of complex shapes formed by mechanical operations on pressed slugs. As to limitations of size, 8 lb projectile cores were made in large quantities. Today rolls for cold rolling of metals are made in lengths, including solid carbide journals, of over 40 in. and of 2-in. diam. Rolls 14-in. long and 3-in. diam have been made for cold rolling of razor blade steel.

How to Use Carbide Cutters for Milling • • •

—Semi-Steel
—Ni-Resist
—Alloy Cast Iron

Always difficult to machine with conventional tools and equipment, semi-steel, alloy cast iron and Ni-Resist can now be milled at a high rate of speed and with excellent tool life by the proper application of carbide cutters. Illustrated by examples taken from actual shop practice, this article, seventh of a series, points out the difference in technique for machining these materials, as compared with regular cast iron, and gives optimum machine and cutter settings.

° ° °

By H. A. FROMMELT

Consulting Engineer, Chicago

° ° °

THE term semi-steel is not taken metallurgically in this article. It is sometimes, if not frequently, used by shop men to designate types of cast iron containing a certain percentage of steel, and is also extended to cover the alloy cast irons such as are commonly specified by the automotive and similar industries.

In this article, however, the term semi-steel is used solely to designate those materials that do not on the one hand fit into the steel bracket, and on the other, while belonging to the cast iron family, machine similarly to steel. In other words the metal removal technician is concerned primarily with the formation and elimination of the chips, and during this activity he is concerned with the shape and general behavior of the chip. Since those alloy cast irons form a sort of semi-chip, the term semi-steels is for present purposes arbitrarily applied to those materials. Hence, engineering materials belonging to the cast iron family, but which because of their nature form chips similar to those of steel, are here given detailed consideration with respect to their machinability during the milling process.

Since these enriched relatives of cast iron are, generally speaking, harder than the older generation, the machinability varies. At least this is one, if not the first, factor that influences and changes the machinability.

Perhaps the most notable phenomenon in the milling of these semi-steels is the manner in which the chip forms when removed by the cutter.

One modified specification in the technique common to all milling operations in this class is the change in cutting angles. For these materials the same cutting angles are used as for steel. Hence, a 7° negative radial rake angle and a 7° axial rake angle, formerly considered applicable solely to the milling of steel, are now applied to the milling of semi-steel.

The reason is simple and easily explained. The negative radial and axial rake angles for steel are necessary so that the cutting forces are directed against the cutting tool in a compressive, rather than a shear or tensile direction. Carbide in compression is among the best, if not actually the best, of all materials available for engineering applications. Since steels, at least the more common ones, are sufficiently hard to bring about an untimely breakdown of the carbide at the cutting edge, negative angles are applied. Thus an obtuse angle at the cutting edge corner of the blade is presented to the workpiece. This can be expressed in another manner by saying that the cutting forces place the carbide blade in compression at the cutting edge. Hence, longer and more economical cutter life follows.

The same reasoning, quite logically is applied to the milling of the semi-steels. The hardness of these materials is generally in the neighborhood of 200 Bhn and the tensile strength between 50,000 and 70,000 psi, if not higher. Hence, the cutting pressures required to remove metal in the form of chips from such material are relatively high. And so, as in the milling of steel, the negative radial rake angle, along with the negative axial rake angle, and both in conjunction with a suitable corner angle (generally more

RIGHT

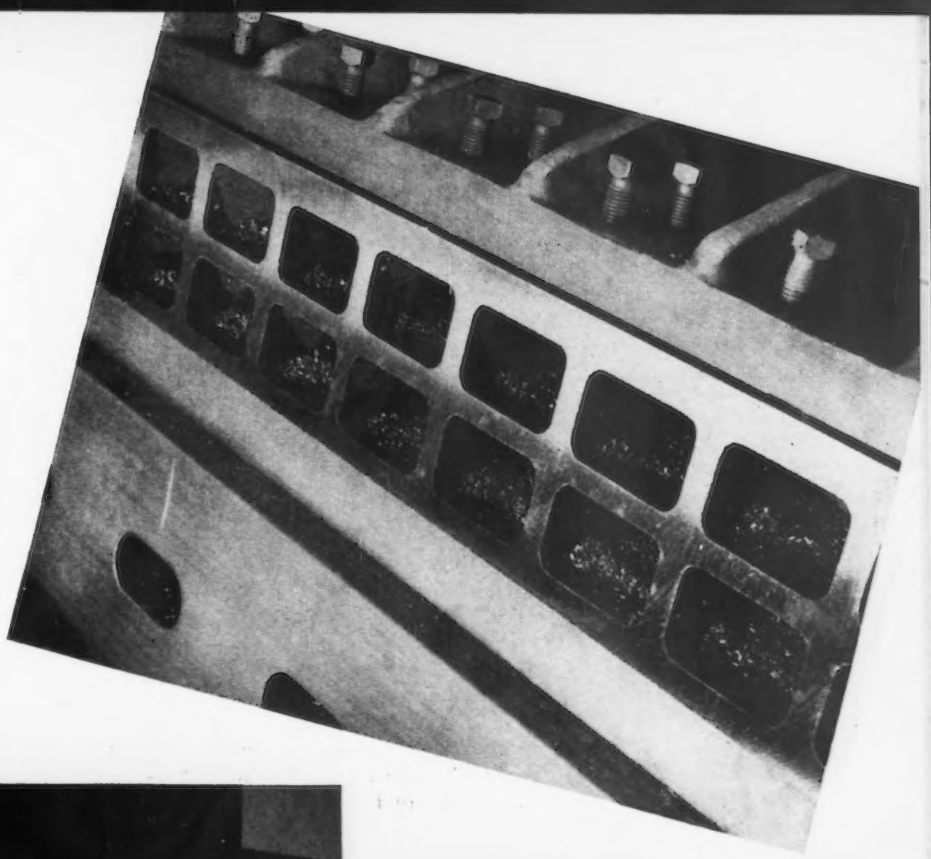
FIG. 43—A common type of honeycomb construction, this vanadium cast-iron block offers many obstacles to machining because of the interrupted cut and the relatively light sections.

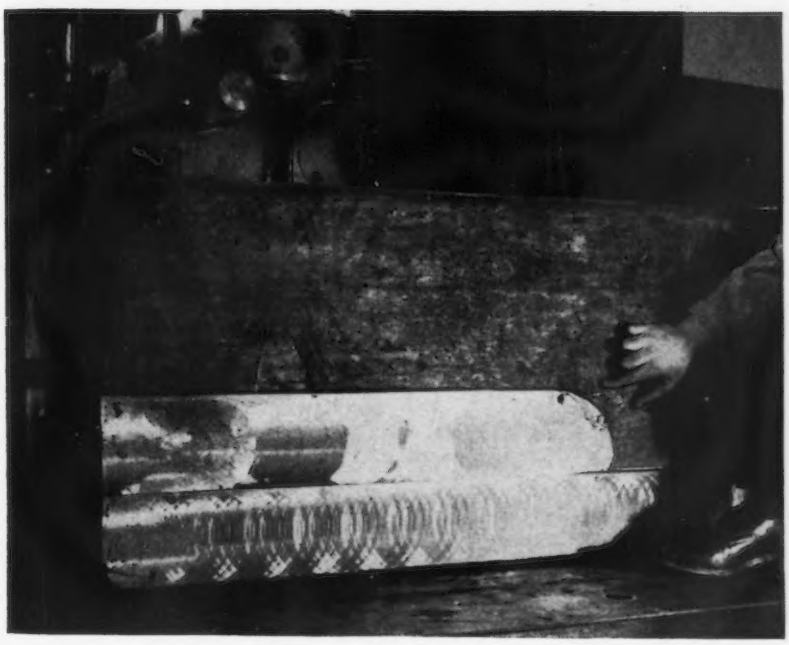
LOWER RIGHT

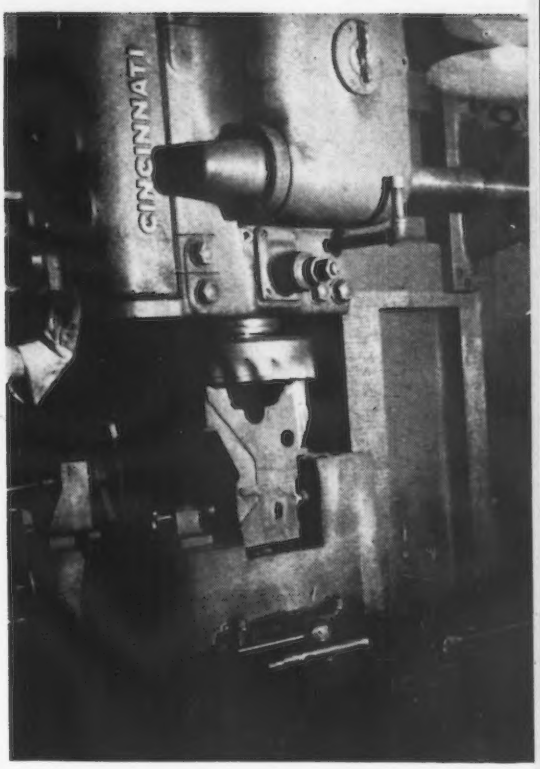
FIG. 45—By the use of a 14-in. 20-blade carbide cutter, automobile cylinder block pan rails can be milled at a feed rate of 20 ipm, an increase of almost 100 pct over previous methods.

BELOW

FIG. 44—Made from cast iron containing a high percentage of steel, this counterweight dulled five high speed cutters in making the cuts shown. With carbide one cutter milled all four sides.







than 0°) is specified throughout the milling of semi-steels.

Fig. 43 shows the milling of vanadium alloy cast iron of a design, commonly referred to as checkerboard. This component presents not only high tensile strength and high Brinell hardness numbers, but also cored areas to the blades in the milling cutters; thus, the machinability of this component presents a challenge to the ingenuity of the metal removal technician.

The 14-in. diam face mill adequately covers the surface of this checkerboard casting in such manner as to mill it clean. It has 18 grade K2S solid carbide blades, and is mounted by means of an adaptor on the spindle of a 30-hp bed type Sundstrand No. 66 Rigidmil.

What appears in fig. 43 to be feed marks is the result of a slight burnishing action by the cutting face of the carbide blade on the workpiece face. The cord areas and their relationship in size to the solid walls that remain, indicate the interrrupted nature of the cut. This, obviously, adds to machining difficulties.

The rpm used is 175 and the surface foot rate, therefore, is 455 fpm. The feed rate is set at 50 ipm. The corresponding chip load, therefore, is 0.016 in. The actual cut is 0.125 in. deep, and yet under these conditions the metal was removed without the least

evidence of effort on the part of either the machine or the cutter.

This material is a vanadium cast iron having a Bhn of 202. Specification is the equivalent of the material widely used in automotive cylinder blocks. The casting is designed to stimulate conditions under which cylinder blocks must be milled.

The construction of the milling machine used on this job makes possible the taking of heavy power cuts without the least evidence of vibration. The table is 144 in. long and 30 in. wide and has a table travel of 120 in. It should be noted that the overall length of this component is 34¾ in., and the overall height is 7¼ in. The finish on this piece of vanadium cast iron is unusual. A profilometer reading indicates a finish of 20 micro inches. This exceptionally low reading is obtained because of the rugged bed type of machine and the sturdy cutter body with its securely wedged-in blades which prevents vibration and chatter, and also because feed marks were removed by the minute runout of one blade.

It is noteworthy that this extremely good finish or low micro-inch reading is obtained at the unusual chip load of 0.016 in. which corresponds with feed rate of 50 ipm. It is interesting to note that the feed per revolution is 0.29 in. and therefore the length of the zero line on the cutting face must be approximately 0.325 in. long.

From the above consideration it can be deduced that with this technique it is no longer necessary either to reduce the chip load to the customary 0.005 in. or less, or to reduce the depth of cut. The customary practice on the latter is to leave a finishing stock of 0.050 in. or thereabouts.

Milling 6½ Ton Counterweights

The problems encountered in the milling of the surfaces of a counterweight will now be considered in detail. The component is set up on the table of a Seller's mill with a 7-in. spindle. This counterweight, while correctly classed as cast iron, has a large admixture of steel and steel alloys in its specification. Hence, its machinability problems are similar to those of steel.

A high speed steel cutter was first mounted on the bar of the machine. This counterweight is approximately 120 in. long, and five high speed cutters were dulled, if not actually damaged in the milling of approximately one and a half passes as shown in fig. 44.

The job was then turned over to an 8-in. diam carbide mill. This cutter proceeded to complete the milling of all four sides. One blade setting and grinding sufficed to mill all sides of this block. Moreover, and this is noteworthy though merely a byproduct of the application of this technique, it required approximately 12 hr to recondition the five high speed steel cutters, dulled in an attempt to mill the surface shown. Approximately 20 min were required to recondition the blades in the carbide mill.

The spindle speed selected for this operation is 125, giving a surface foot rate of 261. To conform to standard practice, a chip load of 0.010 in. is selected, and hence the feed per revolution is 0.16 in. This results in a feed rate of 20 ipm.

It is interesting to note that, experimentally, a sufficient number of passes were taken at 30 ipm to determine the feasibility of this table feed rate. At 30 ipm, the chip load is 0.030 in. On one side of this workpiece is a large cored hole, not visible in the

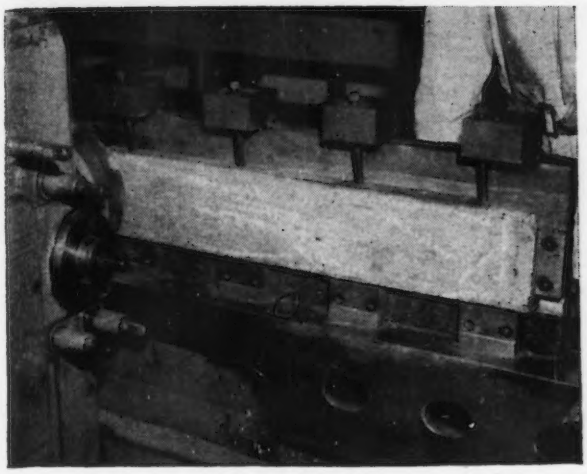
illustration, which results in a portion of the cut being of an interrupted nature. Nevertheless, carbide milling performed this job with exceptionally noteworthy results as indicated above.

Machine Tool Bed Plate

Milling of the bed plates for large machine tools presents another set of problems. These plates are made to alloy specifications and the usual difficulties encountered in the milling of semi-steel are further complicated by the interrupted nature of the surfaces involved. In the case under consideration, the workpiece was set up on the table of a horizontal Giddings & Lewis mill with an 8-in. spindle, and, as in the two previous examples taken from actual shop practice, a 7° negative radial rake angle was used in conjunction with a 7° negative axial rake angle. This, in conjunction with a 15° corner angle, resulted in an obtuse angle at the cutting edge corner of the solid carbide blade. Thus, the cutting forces, relatively high for these materials, were presented in a compressive direction to the carbide blade. This is clearly shown in fig. 3 (part 1, Feb. 13). Since the K land was ground at the negative angle, as shown,

Previous articles in this series covering carbide milling were as follows:

Part No.	*Subject.*	*Issue Date*
1	Fundamentals of carbide milling	Feb. 13, 1947
2	Low carbon steel and wrought iron	Feb. 20, 1947
3	Straight carbon and cast steel	Feb. 27, 1947
4	Heat-treated steels	Mar. 6, 1947
5	Armor plate, heat-treated alloy steel, stress proof steel, die plates	Mar. 13, 1947
6	Stainless steels	Mar. 20, 1947



ABOVE

FIG. 47—Formerly considered nonmachinable, Ni-Resist may now be milled with carbide cutters at surface speeds of 371 fpm and a feed rate of 22 ipm.

LEFT

FIG. 46—Heavy duty, semi-steel cylinder heads, presenting a very interrupted surface as shown here, are being milled at 13 ipm with excellent finish and very satisfactory cutter life.

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the cutting forces, presented as indicated, placed the carbide in compression. Hence, since carbide is stronger in compression, the results, as regards cutter life, were excellent.

The spindle rpm for this operation was set at 125 with an 8-in. cutter mounted on the bar. This spindle speed results in a surface foot rate of 261. The commonly accepted surface rate for straight cast iron is 300. It seems best, therefore, to reduce this slightly when milling these semi-steels. At any rate, the cutter life, using a surface foot rate in the neighborhood of 250, is entirely satisfactory and economical.

If power is available, a chip load greater than 0.010 in. should be chosen. Here 20 hp to the spindle can be utilized and, hence, a chip load of 0.020 in. used. This results in a feed per revolution of 0.160 in. and this in turn equals the table feed rate of 20 ipm.

It is interesting to note that a 5-in. wide cut 0.250 in. deep results in a cross-sectional area of 1¼ sq in. At 20 ipm the rate of metal removed is 25 cu in. per min. The horsepower for this operation is actually 12, hence the K-factor is 0.5. The K-factor for straight cast iron, using carbide cutters has been observed as low as 0.3. Hence, in this operation where a semi-steel component is being milled under the other difficulties of a badly interrupted cut, the K-factor of 0.5 is noteworthy.

Automobile Cylinder Blocks

The problem of milling the pan rail of an automobile cylinder block is twofold because of the reduced machinability due to the relatively high Brinell, averaging 200, and the interrupted nature of the cut. The application of a 14-in. diam 20 blade mill to this problem of milling the pan rail of a cylinder block is shown in fig. 45.

The surface foot rate selected for this operation is 250 and the feed rate, the maximum available in the machine, is 20 ipm. This feed rate represents an increase of approximately 100 pct over the older technique. In fact, using the previous technique, it was impossible to mill at an 11-in. table feed rate without stalling the equipment.

The K-factor in this operation is 0.35, which is extremely noteworthy considering the nature of the cut.

Fig. 46 shows the operation of carbide milling a heavy duty cylinder head, of semi-steel or alloy cast iron composition.

The method of holding is unique and deserves brief comment. A magnetic chuck, with the end stops as shown, holds the work securely and rigidly against the heavy cut representing the full power of a large 20-hp planer type milling machine. Rectifiers reduce the line voltage to 6 v and thus, there is no electrical hazard in the use and application of the chuck.

The 10-in. diam face is equipped with K2S blades, ground with negative cutting angles as used for steel. The resemblance of the chips to steel chips is clearly evident from an examination of the illustration. Machining or milling operations on semi-steel or alloy cast iron components do not result in a powder such as is characteristic of straight cast iron.

A surface foot rate of 340 was selected for the milling of this component and this results in a spindle speed of approximately 130 rpm. With a 0.010 in. chip load per tooth, the feed per revolution is 0.10 in. and hence the table feed rate is 13 ipm.

It is estimated that the horsepower input to the spindle for this operation is 13. This results in a K-factor of slightly less than 0.5.

The interrupted nature of the cut is obvious from the illustration. Nevertheless, the cutter life is satisfactorily economical. The finish is far superior to that possible with high speed steel, and since the handling time is drastically reduced by application of the magnetic chucks, the overall floor to floor time is now but a fraction of that required when using the older technique.

Milling Ni-Resist

Included in the wide variety of materials now being carbide milled is a Ni-Resist component. This material has an especially low machinability rating, and in this respect resembles stainless and similar ferrous materials. Nevertheless, in spite of the difficulties usually encountered in machining, not to say milling this material, the component represented in this operation is milled at significant rates of feeds and speeds. Moreover, the cutter life as indicated by a preliminary cutter life test is exceptionally high.

The Sundstrand No. 33 Rigidmil used in this operation is equipped with a 7½-hp motor. This is generally considered to be too small for effective carbide milling, yet this material, Ni-Resist, with an extremely low machinability, is milled at a speed rate which is impossible with any other technique.

This component is used in the construction of bakery machinery because of its resistance to corrosion and staining. It is made from International Nickel Co. No. 1 regular Ni-Resist composition, the approximate analysis of which is: 15.50 Ni, 6.50 Cu, 2.10 Cr, 3.15 total C, 1.75 Si, 1.25 Mn.

The 8-in. diam face mill used in the operation is of the standard face mill design. Since this workpiece is approximately 5-in. wide, the application of this 8-in. diam face mill represents good practice.

The spindle speed for this job is set at 177 rpm,

which represents a surface foot rate of 371. The feed rate used is 22 ipm. This feed rate represents a chip load of 0.015 in. The depth of cut is 0.125 in.

The selection of the surface foot rate somewhat higher than is usually applied to cast iron, that is 371 fpm, is significant. This has been determined by experiment and should be considered as a guide to the successful milling of this material. In spite of the relatively high chip load, the surface condition is excellent. In fact a microinch reading shows a surface condition of approximately 20 microinches.

The setup used for this operation is shown in fig. 47, wherein is evident also the relationship between the 8-in. diam face mill and the width of the component.

The outstanding result of this performance is the fact that these stainless, corrosion resistant materials can be milled. Until the advent of carbide milling it was necessary to place these materials in the nonmachinable bracket. However, Ni-Resist is not only machined but is milled at a signficant rate of metal removal as represented by the 22-in. feed rate. In addition, the surface appearance and finish are excellent. Finally, as in all carbide milling, the results are obtained without benefit of coolant.

Summarizing, then, the so-called semi-steels, in which classification for present purposes all materials forming chips similar to steel are placed, are economically and satisfactorily milled using the carbide milling technique, when the same negative angles as applied to steel are used. These semi-steels have a relatively high tensile strength and therefore the cutting forces are proportionally high. Thus, it becomes necessary to grind such angles on the carbide blade as will direct the cutting forces in a compressive direction. Hence, the negative angles common to the milling of steel are now considered standard technique in the milling of semi-steels or alloy cast iron.

Specifically, the radial rake angle is 7° negative and the axial rake angle is, likewise, 7° negative. The corner angle may be 15° but preferably 45° for the most economical cutter life. Moreover, a radius should join the cutting face with the OD edge of the blade. Here an actual radius of approximately 1.25 in. is desired. Under these conditions the maximum cutter life, particularly on interrupted cuts, will characterize the milling operation.

Corrosion resistant materials, also in the cast iron series, such as Ni-Resist can be successfully milled at surface foot rates in the neighborhood of 350 and with a relatively high chip load such as 0.015 in.

Where standard milling equipment is being used the addition of a flywheel is desirable. This will tend to direct a smooth flow of power to the cutter, eliminating impact blows on the carbide blades and thus increasing cutter life.

Part 8 of this series on carbide milling will appear in the April 10, issue.—Ed.

New Books

"Metallizing Nonconductors," by S. Wein. A comprehensive review of methods of metallizing, or deposition by plating, of metals on nonconductors. It gives a historical review of the subject and also contains extensive patent listings. Chapter headings include: Mechanical films; chemical reduction films; cathode sputtering and metal spraying, and plating. It is written from a practical viewpoint and contains considerable detail on formulas and procedures. Metal Industry Publishing Co., 11 W. 42nd St., New York 18. 62 p. $2.00.

* * *

"Machine Design," by L. J. Bradford and P. B. Eaton. Fifth edition of this well known work revised and brought completely up to date by a review of progress made during recent years and the deletion of obsolete material. All phases of machine design are covered, including lubrication, friction, material fatigue, bearings, gearing and other machine elements. John Wiley & Sons, Inc. 440 Fourth Ave., New York 16. 283 p. $3.25.

* * *

"Trade Mark Manual," by D. Roberts. A practical working manual covering the use of trade marks, based on the requirements of the new Lanham Act. It defines functions of trade names and marks, describes the various types of marks used, tells how to register such marks and how rights may be acquired to a trade name and gives remedies for infringement and misuse. Bureau of National Affairs, 24th and N Sts., Washington 7. 395 p., $6.50.

* * *

"Machine-Shop Estimating," by W. A. Nordhoff. Provides a scientific basis for evaluating the performance of machine shop operators by showing how to estimate the time required to perform a job. The book lists all the elements of operations performed in a machine shop and establishes reasonable time values for their execution by the average operator. Operations are fully described, and various methods of estimating the time for fabricating machined parts are explained. McGraw-Hill Book Co., Inc., 330 W. 42 Street, New York 18. 486 p, $6.00.

* * *

"Manufacturing Processes," by Myron L. Begeman. Second edition covering the technical fundamentals of all important manufacturing processes, engineering materials and modern equipment necessary for processing these materials. Includes foundry practice, welding, heat treatment, powder metallurgy, machine shop work on all major types of machine tools, as well as chapters on plastic molding and inspection. John Wiley & Sons, Inc., 440 Fourth Ave., New York 16. 626 p., $5.00.

* * *

"Learning to Weld," A simple basic approach to the practice of welding. The booklet teaches how to weld and how to apply arc welding to repair of broken parts, hard surfacing and building of miscellaneous equipment. Subjects treated include types of welds, fit-up, welding procedures, cast-iron welding and hard surfacing. Lincoln Electric Co., Cleveland, 1. 32 p., $0.25.

JULIUS A. KRUG, Secretary of the Interior, (center) a guest speaker at the opening session of the AIME 75th anniversary celebration, chats with AIME president Louis S. Cates (left) and Clyde Williams (right) president-elect of AIME.

AIME Marks 75th Anniversary

Anniversary meeting in New York features mineral resources symposium . . . Industrial uses of atomic energy appraised . . . Howe lecturer examines iron and steel making processes . . . Gases in metals is subject of Iron and Steel Institute lecture.

WORLD mineral resources and economics, industrial applications of atomic energy, and various technological phases of ferrous and nonferrous metal production were among the subjects explored at the annual meeting of the American Institute of Mining and Metallurgical Engineers held last week in New York. The meeting was highlighted by the 75th anniversary celebration which was held concurrently with the general sessions. The anniversary celebration sessions covered such subjects as world mineral resources and economics, the mineral industry and atomic energy and a forecast of mineral technology. These subjects were covered in an exceptionally comprehensive and authoritative manner and presented a detailed picture of mineral situation of the world in the present and the future.

The Iron and Steel and the Institute of Metals divisions of the institute held the customary technical sessions and committee meetings during the latter part of the week. Abstracts of several of the papers presented at these sessions are published later in this report.

The 75th anniversary banquet of the institute of Wednesday saw the induction of Clyde Williams, director, Battelle Memorial Institute, as AIME president for 1947. Mr. Williams, who also served as head of the War Metallurgy Committee, is probably one of the best known metallurgists in the country today. He has been a member of the institute for some 20 years and served as a director from 1941 to 1944.

The annual presentation of awards for outstanding achievement, a feature of the banquet, saw the following men honored. The Charles F. Rand medal was awarded this year to George M. Humphrey, president, M. A. Hanna Co. Mr. Humphrey was cited for "constructive leadership in establishing great enterprises for the production of iron ore, of steel and of coal."

The William L. Saunders gold metal was presented to LeRoy Salsich, president, Oliver Iron Mining Co., for his conspicuous success in developing men and methods of mining and transporting iron ore and for significant contribution to the nation's production of steel during World War II.

Harry K. Ihrig, director of laboratories, Globe Steel Tube Co., Milwaukee, was this year's recipient of the Robert W. Hunt medal. The award was based on research conducted by Mr. Ihrig on the effect of composition on the hot workability of steel.

The Anthony F. Lucas medal was presented this year to William N. Lacey, dean of the graduate school, California Institute of Technology, for his research into the chemistry of hydrocarbons.

Kurt Neustaetter, blast furnace engineer, Inland Steel Co., was the recipient of the J. E. Johnson, Jr., award for his work on the effect of gas flow on coke consumption and on the use of scrap in blast furnace burdens.

The Rossiter W. Raymond award was won this year by William A. Johnson, of the Clinton Laboratories, Oak Ridge, Tenn. for his paper "Diffusion of the Stable Isotopes of Nickel in Copper." Mr. Johnson was formerly manager of the metallurgy section, Westinghouse Research Laboratories.

Atomic Energy and Industry

ONE of the phases of atomic energy discussed at the mineral resources symposium was the application of nuclear power to industrial applications. This subject, discussed by H. A. Winne, vice-president, General Electric Co., and B. R. Prentice, assistant to Mr.

Winne, was approached from a commonsense, factual viewpoint and was much in contrast with some of the elaborate but unfounded speculations which have appeared in print previously.

Touching on the use of atomic energy power plants, Mr. Winne said that the heavy protective shielding required on any such plant precludes its use where extremely light weight is required. Such a shield would crush an automobile or truck. Atomic power for inhabited aircraft was said to be extremely unlikely, at least for a long, long time. However it was thought that it may ultimately prove possible to design an atomic power plant for a locomotive, although this does not look feasible now.

Atomic plants for naval and large commercial ocean going vessels were listed as looking definitely possible and attractive from the viewpoint of making refueling periods farther apart. This, it was said, may be the first real commercial application. Atomic power plants for land use are certainly technically possible, and probably will be attractive first where fuel is scarce and high in cost. Commenting on the economics of electric power generation by an atomic pile, the speakers pointed out that such a power station would be similar to a coal or oil-fired station in all parts from the turbine steam pipe on to the consumer, and consequently the investment and operating costs for this part of the system will be essentially the same for atomic plants as for coal or oil plants. In modern public utilities the cost of fuel represents only about, on the average, 20 pct of the total cost of power to the consumer. Hence since the saving in an atomic plant will be largely in fuel costs, the savings resulting from such a plant could affect only this 20 pct of the total cost of power.

Mr. Winne emphasized that discussions of atomic power plants visualize the use of the heat of the pile for generating steam for driving a turbine and that there is today no possibility of obtaining usable electric power directly from an atomic pile.

Mr. Winne also discussed the possible use of radioactive tracers in metallurgy to permit the identification of minute impurities in a metal. Tracer material could also be used in processing industries, he said, if the cost of radioactive carbon (C^{14}) could be reduced. He estimated that a cost of about $500 per g (50¢ per mg) would have to be realized before such use becomes feasible in petroleum, coal tar and similar large volume production. Against this figure is the fact that the 1946 price of C^{14} from the Manhattan district was about $400,000 per g. On the other hand it was noted that the radioactive carbon might be usable in bulk organic chemical production at $10,000 per g, or in pharmaceuticals at $100,000 per g.

World Mineral Resourses Studied

A GLOOMY picture of the outlook for the world's mineral resources available to the United States at current prices was forecast by many speakers at the World Conference on Mineral Resources held in conjunction with the 75th Anniversary Meeting of the American Institute of Mining and Metallurgical Engineers last week.

However it was clear that metals and minerals would be forthcoming to meet industry demands at higher prices made necessary by increased transportation costs, beneficiation of lower grade ores, much higher exploration and development costs, and other new technological advances requiring larger capital expenditures.

New techniques for minerals exploitation of the future were discussed by Institute President Louis S. Cates, president, Phelps Dodge Corp., and Howland Bancroft, mining consultant.

New geological methods used for prospecting for and exploring mineral deposits, Mr. Cates said, include the use of ultra-violet light, the electroscope, the Geiger-Mueller counter and other geophysical methods combining electric and magnetic techniques. The airborne magnetometer, especially when operated from a helicopter, appears to represent the most revolutionary new development in geophysical prospecting. Results from a two hour helicopter survey are said to be the equivalent of 108 days of a conventional ground survey.

Aluminum

Prior to the war two-thirds of the domestic consumption of bauxite was imported principally from Dutch and British Guiana and Europe. During the war the Bureau of Mines carried on an extensive exploration program in Arkansas which revealed reserves estimated by the bureau to be nearly 40 million long tons containing 32 pct or more alumina, of which only a small percentage is high grade bauxite. Attempts to improve the quality of bauxite ore by beneficiation have been under way for many years. Clay removal by log washers, wet screening and rake-classifiers has been practiced for years. Magnetic and electrostatic methods to remove iron oxide have also been used with some success. Beneficiation by flotation is now receiving renewed study.

The most notable advance in the beneficiation of bauxite in recent years is the introduction of the Alcoa Combination Process which operates in conjunction with the standard Bayer Process. It permits the economical recovery of alumina and soda from the waste material produced in the Bayer Process, which has been wasteful when used with bauxite containing excessive amounts of silica in the combined form. The Alcoa Process, by controlled sinter technique, recovers most of the alumina and soda from the Bayer waste.

Magnesium

Magnesium, aside from its light weight characteristic is important because of its unusual properties as an engineering material and its abundance and availability. The carbonite, oxide and chloride compounds appear most frequently, as dolomite, magnesite, brucite and carnallite. In addition to these abundant ores an unlimited supply of the metal is available in the ocean and in concentrated deep well brines.

Copper, Lead and Zinc

Potential reserves of copper, lead and zinc for the future were tied in with the selling prices of those metals by Clinton H. Crane, president, St. Joseph Lead Co. in a paper on "Copper, Lead and Zinc Mining in the Future." According to careful studies by reputable authorities there is no doubt that present ore reserves in these metals are ample for the next 15 to 25 years

at current production rates and perhaps higher rates. Such reserves are based on existing mines and mining districts and are qualified on the basis of present costs and reasonably conservative estimates as to future selling prices.

It is apparent, said Mr. Crane, that we must go farther afield for supplies as nearby resources are exhausted. For the next 100 years it is predicted that there will be sufficient supplies of these metals for every essential world need. This assumption is taken in the presumption that the price of the metals must be high enough to pay all the expenses of mining, milling, smelting, refining and transportation, and sufficient additional to compensate for the cost of exploitation and capital investment.

In the past the prospecting for new ore bodies has been the most poorly paid occupation in the world. A handful of prospectors who made their fortunes caused the larger number to work for a bare subsistence. This era is coming to an end, Mr. Crane said, and the search for ores all over the world will now be intensified.

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LOUIS S. CATES (left) and four of this year's AIME medal winners. The award winners are (left to right) LeRoy Salsich, president, Oliver Iron Mining Co.; William N. Lacey, California Institute of Technology; Harry K. Ihrig, director of laboratories, Globe Steel Tube Co.; and G. M. Humphrey, president, M. A. Hanna Co.

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Iron Ores

The United States steel industry, destined to be the greatest supplier of steel for the world market for many years, faces a dire shortage of high grade iron ore within a period too short to be comfortable, C. M. White, president of Republic Steel Corp., said in another address.

Mr. White warned that the problem of beneficating America's vast reserves of potential ores must be faced. "It is unlikely any great new deposits of high grade ore will be uncovered in either the United States or western Europe," he said.

Unless the United States steel industry centered about the lower Great Lakes equips itself with plants capable of concentrating low-grade ores into material usable in its furnaces, it must resign itself to a declining steel production and elect to watch its present plants gradually become of secondary importance as they yield to expansion of plants elsewhere in this country, Mr. White stressed.

The steel plant executive defined potential ores as those which cannot compete with actual ores because they are too low in iron content, too high in undesirable constituents, or inaccessible to steel plants or markets by reason of cost or distance.

"We face an unprecedented demand for steel. Also, we face a future fraught with profound economic problems and difficulties," the Republic official said. "We must install concentrating plants and use the magnetic taconite of the Mesabi range and the magnetic ores of New York, New Jersey and Pennsylvania. Methods for the concentration of low-grade hematite ores are being studied intensively, but practices have not yet been developed to a point where a commercially attractive finished product can be produced.

Howe Memorial Lecture

THE Howe Memorial Lecture, always an outstanding feature of the Iron and Steel Division meetings, was no exception this year. The 1947 lecturer was H. W. Graham, director of metallurgy and research, Jones & Laughlin Steel Corp., Pittsburgh, whose subject was "Factors Which Determine Iron and Steel Making Processes." Dr. Graham examined the essential technological elements of iron and steel making processes in order to explore the interrelation of the various elements and particularly to seek recognition and understanding of the various processes and why certain processes are or are not used. He stressed particularly the need for being on the alert for process changes required by changes in the nature of raw materials which, over passing years, have been exerting a larger influence on the operation of the various processes. Particularly, he stressed the need for considering the development of an iron making process which would tolerate ore of fine particle size, since the trend of ore is more and more to higher amounts of fine material.

In commenting on combustion, Dr. Graham discussed the current investigations of the use of pure oxygen to enrich air blast for the blast furnace or bessemer, and for openhearth combustion or reaction. The lecturer said that a blast furnace would still be a blast furnace, even if supplied with 30 pct oxygen air blast.

Discussing the development of direct reduction of iron bearing material, Dr. Graham pointed out that if

the iron and steel industry chose to deal with low temperature liquid chemical solutions rather than high temperature molten metals, such a step would displace coke ovens, blast furnaces, steelmaking furnaces and even blooming mills, but would replace these with chemical plants of staggering size and cost. Nevertheless, he said, a pilot plant is now being constructed to produce iron powder and its operation, when completed, will be followed with interest.

There has been a suggestion, Dr. Graham stated, to use a direct reduction process for partial reduction to provide a higher natural iron content in the blast furnace burden. Since this method would involve expenses in addition to all of the present processes, there appears to be little reason to expect that the increase in iron production would justify the extra step. Summing up the direct reduction situation, the lecturer pointed out that, due partly to economic pressure, technology is moving closer to effective ways of ejecting gangue and achieving direct reduction. The answer may be closer than it appears, he added.

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HERBERT W. GRAHAM, the 1947 Howe Memorial Lecturer. Dr. Graham is director of metallurgy and research, Jones & Laughlin Steel Corp., Pittsburgh.

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The Howe lecturer also discussed the use of back top pressure in blast furnace operation and expressed the belief that it would mean less flue dust would be produced and in this manner definitely increase output. The trend to leaner ores, or concentrated material of fine particle size, is another factor which makes study of higher top pressures important.

In summing up his lecture, Dr. Graham said, "The serious student of process metallurgy may envision a future in which there may become economically practicable and mechanically feasible on a large tonnage scale, a direct process wholly in the solid phase with or withoutt chemical preparation. But such a devolopment would not bring an end to the metallurgy of molten steel. So long as the characteristics of steel and the circumstances of its use remain substantially as they are today, there will be a justification for the salvaging of steel scrap, until that time when virgin steel becomes so cheap as to make reclaiming operations economically unjustifiable. From today's point of view that eventually appears remote indeed.

"No situation within the limits of practical envisionment shows any end to the metallurgy of molten steel. Imagination may fancy iron and steel as resulting directly or as a by-product from atomic transmutation, but that future is hidden in the as yet unrolled scroll of years to come."

Gases in Molten Metals

ONE of the most annoying practical problems faced today by nonferrous metallurgists and foundrymen is the control of gases or gas-forming elements in molten metal. Many largely empirical rules are utilized for preventing the retention of excessive amounts of gas in the casting, and the use of deoxidizers such as phos-copper is fairly well established. However there has been in the past a lack of understanding of the factors effecting gas evolution and a lack of reproducible means of controlling the amount and nature of the gases in molten metal. Lacking this understanding, it is apparent that any method used for attempting to control the gas problem would be most erratic.

However this problem has now been attacked in a manner which will place the gas problem in nonferrous metals on a scientific basis and make possible the production, in the average foundry, of consistently higher grade castings. This solution, the culmination of close to 20 years of research, was presented in this year's Institute of Metals Lecture by A. J. Phillips, manager, research division, American Smelting & Refining Co., Perth Amboy, N. J. Dr. Phillips' lecture was entitled "The Separation of Gases from Molten Metals."

The important industrial significance of Dr. Phillips' discussion lies in his quantitative consideration of the separation of gases from molten metals, making it possible to evaluate mathematically the gases or gas-forming elements and to develop an understanding of the mechanism of gas separation, to permit control of this hitherto baffling phenomenon.

The author has not only correlated data relating to the gas-forming elements, such as oxygen, hydrogen, steam, sulfur dioxide, carbon monoxide, etc., and their effects, but has projected his research to evaluate, quantitatively, the various equilibrium relationships. It is evident that quality control of gas separation resolves itself into an analysis of the equilibrium relationships of the various elements involved. Among the more important equilibrium systems found in copper are: copper-sulfur-oxygen, copper-steam, copper-carbon, copper-sulfur-hydrogen-oxygen, as well as the systems concerned when phorphorus is used as a buffer.

The difficulty in correctly interpreting equilibrium systems is indicated by the author in his discussion of the copper-sulfur-oxygen system, for example, wherein he emphasizes that the evolution of SO_2 in Solidifying copper depends upon; (1) the equilibrium relationship between sulfur and oxygen to create SO_2 gas at one atmosphere pressure in the liquid copper, (2) the equilibrium relationship betwen solidifying copper and the liquid copper, and (3) the rate of diffusion in the solid copper.

More data is required, according to Dr. Phillips, on oxygen equilibrium relationships for practically all alloying elements at the melting point of the host metal or alloy, and on exact solidus determinations in the gas-metal systems, in order to realize a more complete understanding of gas separation problems.

New Equipment . . .

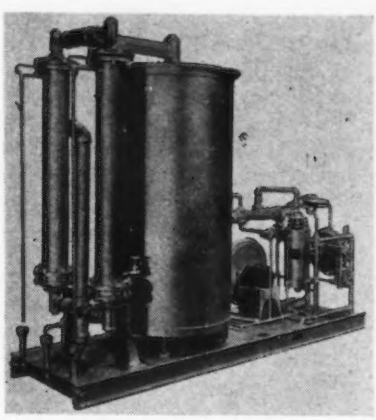
Heat Treating . . .

Atmosphere producers, laboratory furnaces, bench model heaters, induction heaters, a spindle and quench unit, heat control instruments and various furnace equipment such as burners, doors and ports are described in this week's announcements.

Metal Cleaning and Finishing . . .

Recent developments in vacuum coating units, melting tanks, a plating test device, electroplating rectifiers, and coatings such as strippable plastics, plastic finishes and polishing compounds are also discussed herein.

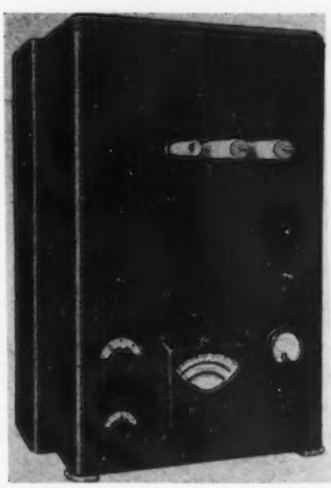
[1] The Vapofier gas generating unit developed by *Vapofier Corp.*, 10316 South Throop St., Chicago 43, for industrial heat applications, can serve also as a means of firing atmosphere producers, which are used in connection with electric furnace equipment. The Vapofier, utilizing fuel oil, generates Vap-O-gas, which is burned in the combustion chamber of the atmosphere producing equipment. The resulting products of combustion are then taken through condensers which remove the water vapor and the resulting atmosphere is delivered to the furnace or oven under any desired pressure. The fuel-air ratio may be predetermined and



maintained throughout the entire range of capacity of the Vapofier, without change in the manifold pressure. The flame quality may be varied from oxidizing to reducing, and once the proper analysis of products of combustion is determined, the unit may be set so that it will produce the same results regardless of demand. A built-in diaphragm control system instantly and automatically adjusts to any variance in requirement without change in flame quality or manifold pressure. The gas generating unit, controlled by any standard automatic controlling instruments, occupies only 2 x 4 ft of space. It is built with capacities from 70,000 to 2,000,000 Btu per hr.

High Temperature Furnace

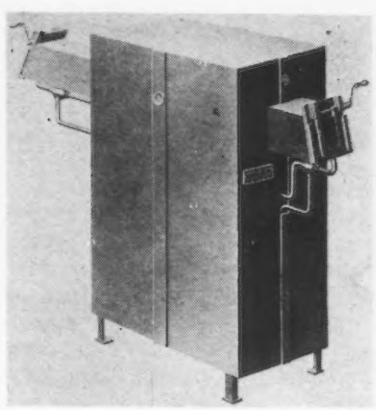
[2] A high temperature laboratory combustion furnace marketed under the name of Hitemp has



been designed for use as a single, double or triple tube unit and is said to have a maximum high operating range of 2900°F to allow for any future increase in temperature for heat resisting alloys. The furnace manufactured by the *Harry W. Dietert Co.*, 9930 Roselawn Ave., Detroit 4, is an integral unit ready to plug into a 220 v outlet and is equipped with complete power supply, ammeter, rotary power selection switches, heating elements, automatic temperature control and thermocouple. A combination disconnect switch and circuit breaker is provided which automatically protects the furnace against overloads. An electronic automatic temperature controller selects furnace temperature in advance and the temperature selected is automatically controlled. Six ¾-in. diam heating elements provide a radiating surface area of 128 sq in. Interior firebrick lining is said to withstand a maximum temperature of 3000°F.

Laboratory Box Furnace

[3] Offered to meet requirements for high, automatically controlled temperatures, a box furnace suitable for operation up to 3100°F has been announced by *General*

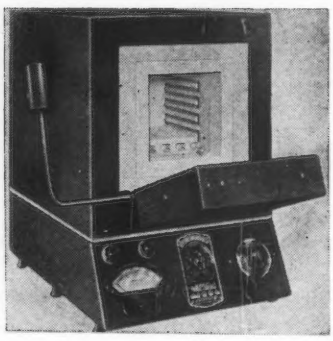


Electric Co., Schenectady 5. The furnace has been developed for operations such as melting and bright annealing of metals, sintering of powdered metals, reduction of metallic oxides, ceramic firing, and copper and silver alloy brazing of metals. As heating units must be protected against oxidation, the furnace is limited to operations which can be performed in a pro-

tective atmosphere. The heating units which are molybdenum rods formed into sinuous loops and supported inside the heating chamber are rated 20 kw, 65 v single phase at 3100°F. The heating chamber is 4 in. wide, 4½ in. high and 25 in. long, and is lined with refractory brick backed by heat insulation. Automatic temperature control is provided by a standard type temperature control instrument.

Laboratory Furnaces

4 Model 9A De Luxe, a medium size laboratory furnace with built-in automatic temperature controls has been developed by *H. K. Huppert Co.*, 6830 Cottage Grove Ave., Chicago 37. With overall dimensions of 19 in. x 20½ in. x 21¼ in., the furnace maintains any desired temperature automatically between 250° and 1900°F, and reaches a maximum 2000°F, according to the manufacturer. The heating unit consumes 2000 w at 110 v, ac only, and is constructed of heavy gage special alloy wire. The furnace itself is made of heavy gage steel, with multi-layered insulation. Inside dimensions are 6 x 6 x 6 in. with a 3¼-in. throat additional. The complete unit, including automatic heat controls, weighs 148 lb. Huppert No. 5 De Luxe automatically controlled furnace developed for precision use in laboratories and for small unit and batch production work, features a combination three way heat range switch and an automatic temperature timer designed to allow the operator to maintain constant temperatures from 200° to 1800°F, with a minimum variation of not more than 10° and which also can be regulated to bring the furnace to heat fast or slow as desired. Maximum operating temperature is 2000°F. Built-in temperature controller and heat range switch, a pyrometer, two porcelain loading trays and two pilot lights for indicating furnace operation are described as standard. Dimensions of work chamber are 4¾ x 3¾ x 9 in.



Induction Heaters

5 Induction heaters, adaptable to particular production problems and requirements have been offered by the *Weltronic Co.*, 19500 W. Eight Mile Rd., Detroit 19. These electronic high frequency generators are of rigid steel frame construction with aluminum paneling to reduce power loss. Design features include a blower for cooling which forces filtered air into the double wall between oscillator and rectifier section, air is directed to all heat producing parts by means of perforations. For three phase power supply this induction generator presents a completely balanced load, it is said. Units can be used for hardening and heat treating parts such as gears, tools, dies, gages, cams, bearings, shafts and rods.

Steel Processing

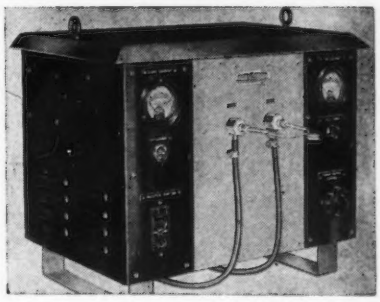
6 A process known as Vee-Ogi-nizing has been developed jointly by the *Jessop Steel Co.*, Washington, Pa., and the *Barium Steel & Forge Co., Inc.*, Canton, Ohio, for processing high speed steel rounds in diameters greater than 4 in. High speed steel rounds in larger diameters processed by this method are said to be free from the usual central carbide segregation that is common to high speed steels as usually processed, through uniform carbide distribution throughout. This eliminates the brittle carbide pattern found in large rounds of high speed steels processed by conventional methods.

Controller

7 Model 40 controller, announced by the *Foxboro Co.*, Foxboro, Mass., embodies improvements in design and construction of the model 30 controller. Features of the new model may be generalized as a simplification of design, resulting in superior performance, easier and more flexible adjustments, and convenience in servicing. Model 40 may be changed from one type of control to another. Setting of the proportional band, from 0 to 200 pct or higher is made by the turn of a thumb wheel. The range of reset is 500:1 and is a continuous adjustment. An improved adjusting device permits zeroing the pen without realineing the control point and a transfer switch enables a change from manual to automatic control. The instrument is used for control of temperature, pressure, flow and other variables in continuous processes. It is made as an indicator as well as a single-pen and multi-pen recorder.

Bench Model Heater

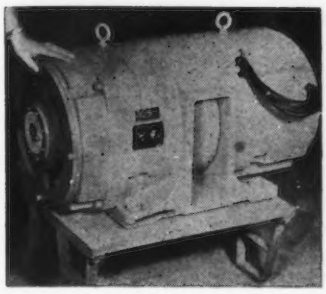
8 A 2 kw induction heating unit 22 in. wide, 20 in. high and 16 in. deep has been designed by Scientific Electric Div., *S Corrugated Quenched Cap Co.*, Garfield, N. J. The heater which operates on 110 v current can be used on a shop bench. It is furnished with foot switch and one work coil made to customer's requirements. This work coil may be from ½ to 2½ in. in diam and the unit is said to operate with a coil of one turn to a maximum of 20 turns.



HF Heating Equipment

9 Said to triple the previous high frequency limit of motor-generator type induction heating equipment, a 30,000 cycle machine has been introduced by the Tocco Div., *Ohio Crankshaft Co.*, Cleveland, to extend practical application of the induction heating process to parts of very small cross section. An adjustable ratio transformer designed to increase the adaptability of motor-generator type induction heating equipment is also available. The transformer can be made to match any size load and any size inductor coil, providing one transformer for all jobs by a simple change of leads. Another recent introduction is the 7½ kw

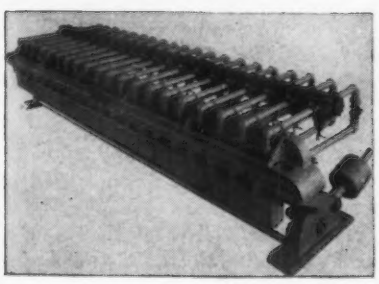
output Toccotron unit designed for increased efficiency when heating parts of small diameter or very thin strip stock. Also now available is the Tocco heat gun which is described as a portable inductor which brings the heat to the work



on large assemblies or short production runs where it is not economical to provide a special inductor coil for each part to be treated.

Superheat Burners

10 By preheating formed strip under a line of superheat burners, produced by the *Selas Corp. of America*, Philadelphia 34, tubing can be made from hot-rolled instead of cold-rolled stock and an expensive edge trimming operation is eliminated, it is said, as well as a reduction in welding cost being realized. Designed for a production line speed of more than 100 fpm, the burners receive formed stock directly from the forming rollers, heat it to 2000°F and discharge it



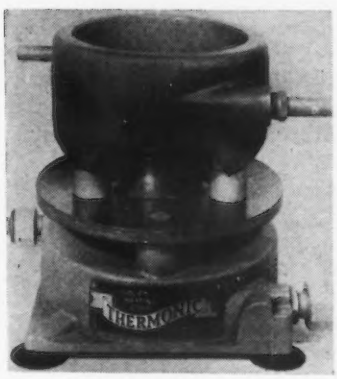
to the welder. The equipment consists of 20 burners with manifolding and frame construction, a gas-air combustion controller, Floscopes and safety equipment.

Electric Furnace

11 Featuring a new type of stepless heat control, an electric furnace of low cost has been announced by *Thermo Electric Mfg. Co.*, Dubuque, Iowa. Known as model GTP, the furnace temperature can be raised or lowered simply by moving a control knob to right or left. Temperatures between 500° and 1850°F can be selected and automatically maintained. The Temco control is said to be nearly 100 pct compensating for normal fluctuations in line voltage and is available for use on dc and ac of any cycle. Model GTP has inside dimensions of 4 in. wide x 3¾ in. high x 3¾ in. deep. It is equipped with an indicating pyrometer calibrated in both F and C scales.

Spindle and Quench Unit

12 A hydraulic rotary spindle and quench ring combination known as Ther-Monic has been designed for use with any type of induction



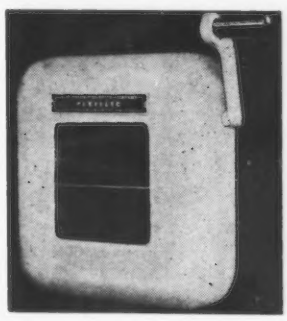
heating equipment for handling and heat treating parts requiring rotation during the heating cycle and subsequent quenching in position. The unit, manufactured by the *Induction Heating Corp.*, 389 Lafayette St., New York 3, is portable, a factor eliminating inherent restrictions of permanently installed spindles and making the combination unit desirable for short runs and experimental work. It may be anchored permanently for production work. Interchangeable quench rings and adapters are available in four sizes, 4¾, 7, 9, and 12-in. ID.

Water-Cooled Door

13 For openhearth and heating furnaces, a water-cooled door has been announced by the *William M. Bailey Co.*, Magee Bldg., Pittsburgh 22. In the new door, manufactured for all openhearth and furnace sizes, water-cooled ribs divide the plastic refractory into easily cooled sections, which not only add strength to the door but also eliminate warpage, it is said, insuring a longer life for both the door and the lining. It is claimed life of refractory linings ranged from 150 to 200 heats in an 11-furnace openhearth.

Furnace Observation Port

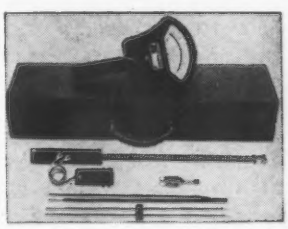
14 An air-cooled observation port for all types of industrial furnaces introduced by the *A. P. Green*



Fire Brick Co., Mexico, Mo., permits the operator to observe furnace and grate conditions with wide angle vision, with no disturbance of the firing cycle and without exposure to heat or glare. Known as the Perfecto observation port, the unit weighs 14 lb and has been designed for installation in new or old common brick, firebrick or steel cased furnace walls. Features include a self-closing air-cooled ribbed shutter and divided blue pyrex window to prevent malfunction from furnace heat.

Pyrometer Kit

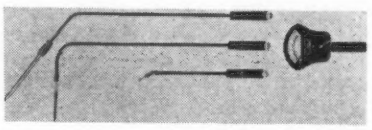
15 Known as Model 2863, a portable pyrometer kit has been introduced by *Wheelco Instruments Co.*, 847 W. Harrison St., Chicago



7. The kit is lightweight and compact, containing a high resistance portable pyrometer equipped with a pistol grip handle, a straight type extension with adapter for Iron-Constantan surface thermocouple, and an assortment of thermocouples. An additional adapter is furnished for use with the bare and prong thermocouple tips which are also included in the kit.

Extension Type Pyrometer

16 Where a rugged, flexible lightweight and accurate portable pyrometer is an essential requirement for quality control in plant and foundry, the *Wheelco Instruments Co.*, 847 W. Harrison St., Chicago, has designed an extension type portable pyrometer to permit a choice of plug-in angle extensions for measuring and checking temperatures requiring the use of different kinds of thermocouples. The instrument has a high resistance meter movement and automatic compensation is a standard feature. To protect the instrument when not in use, a shunt lever is provided which can be snapped into position with a simple thumb movement. Plug-in extensions are available in either straight, 45 or 90° angle types. Adapters permit the choice of material and calibration of thermocouples. The pyrometer is contained in an aluminum case having a pistol grip handle which may be locked in a horizontal or vertical position for ease of operation. A 3 9/16-in. reflector scale prevents parallax errors in reading. Dual Iron-Constantan scales are calibrated from 0 to 600°F, or 0 to



1000°F and dual Chromel-Alumel scales are calibrated from 0 to 1600°F or 0 to 2500°F, with Centigrade equivalents.

Temperature Control Unit

17 Close temperature-variation control is attained with the Xactline temperature control made by *Claud S. Gordon Co.*, 3000 S. Wallace St., Chicago 16. Variations as low as 1/5°F can be accomplished, and power on-off cycles as short as 3 sec. Xactline does not use cams, motors, bearings, shafts, gears or other rotating mechanical parts; it gives straight line temperature control without coordination with other equipment. The unit can be used on all types of electric furnaces, ovens, injection molding machines, etc., employing conventional millivoltmeter and potentiometer type controlling pyrometer or gas-fired equipment employing solenoid-controlled or motor-operated valves. It is designed for surface mounting.

Thermocouple

18 Better heat treating at reduced cost is claimed for an improved thermocouple designed for use with any make pyrometer and supplied with either No. 8 gage standard Chromel-Alumel or Iron-Constantan element. Manufactured by *Arklay S. Richards Co., Inc.*, 62 Winchester St., Newton Highlands, Mass., closer temperature control is said to be obtained through the use of a 7/8 in. OD heavy seamless drawn Inconel protecting tube which fits the thermocouple element closely for maximum sensitivity of response. Other features are unusually heavy wall thickness, 0.147 in., of the protecting tube for long life and the use of 80 pct nickel, 13 pct chromium high grade ductile alloy to eliminate porosity and mechanical breakage frequently experienced with other brittle alloys.

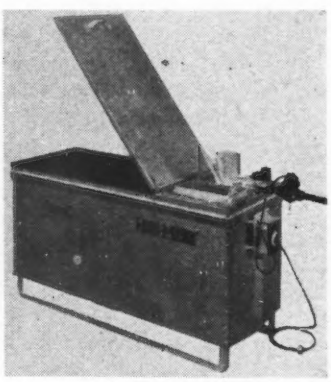
Metal Cleaning and Finishing Equipment

Vacuum Coating Unit

19 A coating unit, Type 3102, representing a new development in medium size vacuum evaporators has been announced by the *National Research Corp.*, 100 Brookline Ave., Boston 15. It is suitable for the preparation of evaporated metal films, the deposition of magnesium fluoride on optics, and for other applications requiring low-pressure bell jar equipment. Embodying a continuously operating, 6-in. high-speed diffusion pump and a large combined roughing and backing pump, the unit has pumping capacity for fast cycles and for handling large amounts of outgassing from materials being coated. The diffusion pump is backed by a small mechanical pump during the roughing cycle. It is reported that a dry-air pressure of 5×10^{-6} mm Hg can be attained after 9 min from atmospheric pressures on a clean, empty 18 in. glass bell jar. A vacuum safety switch is incorporated in the high voltage discharge circuit. Vacuum gages are controlled from a removable unit panel. Bell jars can be either Pyrex 18-in. diam type or 24-in. diam, all steel construction for greater coating capacity.

Melting Tanks

20 For heating, melting, dipping and pouring critical compounds such as wax, parraffin, oils, pitch, hydroline, and for battery, trans-



former resistor and compactor compounds two groups of melting tanks have been developed by *Aeroil Products Co.*, West New York, N. J. Both gas fired and electrically heated equipment is available, the units being indirectly heated, fully insulated, and thermostatically controlled. The tanks are designed on the double boiler principle to insure complete uniformity of temperature in the melting vat. Built-in thermostatic controls are said to hold temperature rigidly at any desired point from 100° to 550°F. Gas fired units are heated from the inside by an immersion tube system. Electrically heated units are available in 15 and 40-gal capacities.

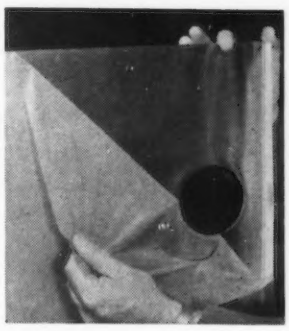
Protective Coating

21 All-weather low-cost protection against rust to journals, castings, driving rods, machined surfaces and finished parts has been provided by *Rust-Oleum*, Box 110-BC, Evanston, Ill., through the introduction of R-9, a liquid rust preventive. It has been designed specifically as an easy-to-apply and easy-to-remove rust preventive to safeguard highly finished surfaces against rusting when in storage,

in-doors or out. R-9 provides a tough, pliant coating that excludes moisture for extended periods. The coating is easy to brush on, dries within 72 hr, and will not rub off. It wipes clean with gasoline, mineral spirits or any solvent even in temperatures as low as 30° below zero and is nontoxic to abrasions or cuts on the hands.

Strippable Compound

22 Spray-Peel, a strippable plastic has been developed by *Eronel Industries*, 5714 W. Pico Blvd., Los Angeles, to help solve corrosive and



abrasive problems in the metal industry. Applied by brush or spray, Spray-Peel dries quickly to a rubbery film; has sufficient adhesion to insure complete sealing; and has adequate tensile strength to permit easy stripping. The strippable compound is nontoxic and has marked resistance to moisture, abrasion, salt water, aromatic spirits and oils, alkalies and acids, and all atmospheric temperatures.

Phenolic Resin Coating

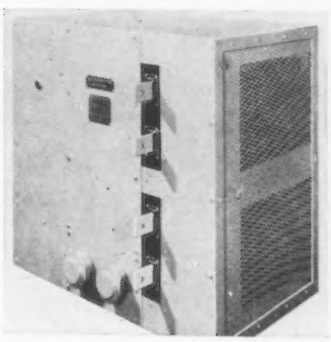
23 Phenoglaze, a phenol-formaldehyde protective coating manufactured in England for use on all types of wood and metal products, is now available to fabricators through *Phenoglaze Sales Corp.*, 315 Broadway, New York 7. Developed for resistance to heat, moisture and chemical action such as that of salt, gasoline, oil, alcohol, turpentine, acetone and other corrosive agents the product is also said to offer complete protection against termites, marine borers, cigarette burns and contraction and expansion caused by extremes of temperatures. The coating is available clear and in colors and may be applied by spray, brush or dipping. High resistance to galvanic influences, acids and alkali solutions is said to make it a valuable finish for furniture, station wagon bodies, wood or steel boats and radio cabinets. The product is air drying and cold setting.

Enamel Stripper

24 Designated as enamel stripper S-45, a spot enamel stripper for removal of synthetic enamel and other coatings has been developed by *Enthone, Inc.*, 442 Elm St., New Haven, Conn. The stripper is a slightly viscous liquid that can be brushed, sprayed or applied by dipping to the work to be stripped. It contains a non-waxy evaporating retardent that keeps the stripper on the work until stripping action is completed. Stripping is accomplished by a wrinkling action so that the enamel can be brushed, wiped or scraped off. No waxy residue is left to interfere with adhesion of subsequently applied finishes.

Electroplating Rectifier

25 Development of an electroplating rectifier, claimed to be a reliable and economical source of dc power, has been made by *Wagner Bros., Inc.*, 413 Midland Ave., Detroit 3. The assembly employs metallic selenium-on-aluminum cells, known for their ability to handle momentary overloads of as much as 1000 pct of normal capacity. Aluminum back plates provide maximum cooling, and low velocity air circulation is provided by three 10 w fans with a low am-



perage of only 1.5. The Wagner-Tiedeman rectifier offers an effective rectifying area of over 4300 sq in. The double-duty transformer is of the two-winding fully insulated type with ample reserve capacity, it is reported.

Plastic Finishes

26 Announced as combining the resistance of Vinylite plastics and the adhesion, depth, gloss and workability of synthetics, a group of finishes in clear and brilliant colors has been marketed by *Watson-Standard Co.*, Pittsburgh 12. The finishes are described as pre-

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3/27/47

THE IRON AGE, New York 17, N. Y.

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12 13 14 15 16 17 18 19 20 21
22 23 24 25 26 27 28 29 30 31 32

NAME..... TITLE.....

PLEASE STATE BUSINESS.....

COMPANY .....

CO. ADDRESS .....

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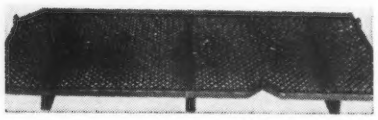
scription compounded, can be applied with any method of metal product finishing either before or after fabrication, and may be applied to both ferrous and nonferrous metals. These high solids Vinylite coatings are said to be adaptable to baking and produce brilliant finishes that have outstanding durability on interior and exterior surfaces.

Plating Tank Grids

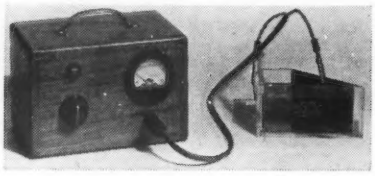
27 Rubber linings of plating and pickling tanks can be protected with seamless rubber covered mesh grids offered by *Automotive Rubber Co.*, 8605 Epworth Blvd, Detroit 4. Tank linings and agitation coils are protected by these rubber insulated grids against damage by heavy or sharp parts which may be dropped in the tank or by contact from baskets and handling



equipment. The rubber coating prevents contamination of the plating solution which results from corrosion of exposed metal equipment. Grids are constructed of expanded metal reinforced with angle iron and supported on heavy channel iron. Lifting eyes are provided for easy removal.

Plating Test Unit

28 Designed to enable a plating operator to observe test plating characteristics of brass, cadmium, chromium, copper, nickel, silver, tin and zinc a clear plastic Hull Cell test unit has been manufactured by *R. O. Hull & Co. Inc.*, 1279 West Third St., Cleveland 13. The test is made by a miniature plating unit designed to produce a cathode deposit that records the character of electroplate produced at all current



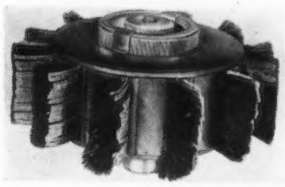
densities within the operating range. Character of the deposit so produced is dependent upon the condition of the plating bath with respect to the primary components, addition agents, and impurities. The Hull Cell enables the experienced operator to determine the following facts regarding plating baths: The approximate limits of bright current density range; the approximate concentrations of the primary constituents; addition agent concentrations; and metallic impurities.

Diamond Compound

29 For use in the field of precision manufacture, a diamond polishing compound has been produced by the *Sapphire Products Div., Elgin National Watch Co.*, Aurora, Ill. The compound is composed of close-graded, virgin diamond powders kept in constant uniform suspension in its paste vehicle, which is said to be nontoxic and nondeteriorating. Its viscosity is such that it possesses clinging properties and may be used on high-speed laps without throwoff. A gun type applicator meters the quantities of diamond used, besides protecting the powder from contamination. Each grade is identified by an individual color. One of the uses of the compound is in finishing the surfaces of steel molds used for plastic molding.

Contour Sander

30 Designed for finishing and sanding of any irregular surface or edge, a heavy duty contour sander has been introduced by the *Sand-O-Flex Corp.*, 4373 Melrose Ave., Los Angeles 27. Known as Model 650C, the sander can be used on any roating shaft, has 12 brush-



backed abrasive strips which are fed out as needed from an internal cartridge. As the tool is rotated, these strips are forced into, around and over any surface or contour. It has a 6⅝-in. housing and 10¾-in. overall diam including height of brushes. The abrasive strips are 2½ in. wide and refills come in various grits and grades, scored or unscored, in aluminum oxide and garnet cloth. The tool having a ¾-in. bore for mounting on a right hand or left hand shaft, can be adapted to a flexible shaft, buffing and polishing lathe, electric motor shaft, drill press, woodworking or metalworking lathe or mandril.

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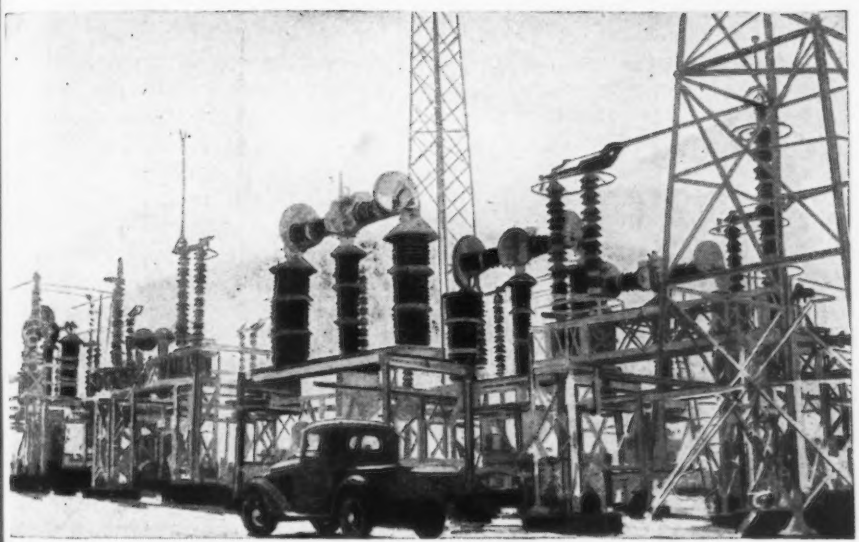
HARPER fastening NEWS

INDUSTRY EYES MAINTENANCE COST



Electric Utilities Demand Endurance at Low Cost

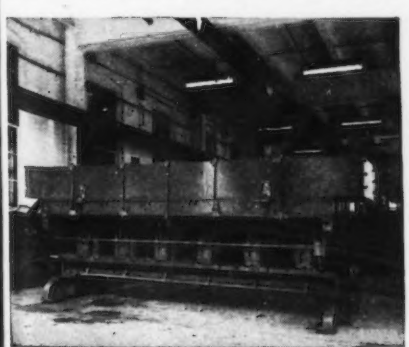
Thousands of miles of power lines which feed countless homes and industries throughout the country must be built as inexpensively as possible yet with rugged endurance to stand weather conditions and severe strains.

This low cost is achieved in the connectors, switches, tower hardware, underground junction boxes and many other details through the use of non-ferrous fastenings. Bolts, nuts, washers and screws that will not rust or corrode and can be used again and again to achieve low maintenance cost.

These fastenings of silicon bronze, and other alloys have great strength and can be depended upon to hold securely.

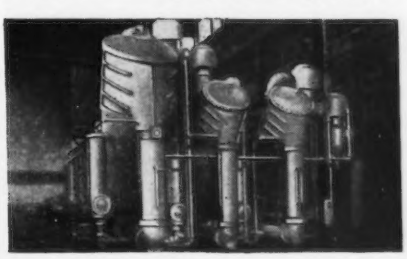
PULP and PAPER MACHINERY MUST BE TOUGH

A packer screen which separates knots and extraneous matter from the pulp solution before drying and forming, in the manufacture of paper, is jogged 600 times per minute against heavy loads. Vital bolts and screws which must stand this strain yet be constantly free for removal in servicing are of Harper non-ferrous and stainless alloys.



FOOD PRODUCTS CORRODE COMMON METALS

Food industries are particularly trying on metals. Most foods themselves have highly developed cor-



rosive properties, yet it is essential that all containers be free from corrosion as is this evaporator equipped with Stainless Steel bolts, nuts, etc.

The H. M. HARPER COMPANY
2607 Fletcher Street
CHICAGO 18, ILLINOIS

Branch Offices—New York City, Philadelphia, Los Angeles, Milwaukee, Cincinnati, Dallas

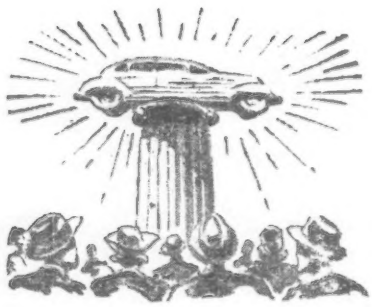
HARPER *Chicago*

HARPER SPECIALIZES IN EVERLASTING FASTENINGS

Assembly Line . . .

WALTER G. PATTON

• Pontiac using efficient punch card system for distributing available cars . . . Used car reconditioning program introduced to Pontiac dealers.



DETROIT — C. E. Wilson, president of General Motors once remarked that nobody has yet discovered a satisfactory system for distributing a shortage. However, GM's Pontiac Div. seems to have developed an *efficient* system for deciding who gets what when there just isn't enough to go around—a situation that is facing many companies today.

The Pontiac system for distributing cars has been described in a recent company publication, *The Pontiac Chieftain.*

Using a modern punch card system and automatic accounting machines, Pontiac is able to do in a few hours what clerical help might require days to accomplish.

Pontiac's car distribution punch cards show at the top the name of the dealer, his zone, number, his percentage of 1941 model shipments and allotment for the current month.

Based on the forecast of this month's production, cards of every dealer are then run through a multiplier machine which figures how many cars each dealer should receive, based on this anticipated production.

A sorting machine then separates the cards by zones after which the cards go through a tabulator which prints a finished report showing the town, state, dealer, name and allotment. The report also indicates the total number of dealers in the zone, the entire zone's basic allotment and the total number of cars that should be received during the month providing production reaches the forecast.

Following a study of the tabulated results, each zone distributor is notified how many cars he is likely to get that month, and the dealer is next advised. The dealer then sends his orders to the zone offices for forwarding to the factory. In many cases this permits the dealer to say approximately when your new car will be delivered to you.

It is interesting to note that the dealer's actual share of Pontiac shipments are always figured to one decimal point; and the fractional tenths of a car are accumulated until they equal a complete car.

There is, of course, one great difficulty in operating such a system for distributing cars. In the event that projected production is not attained—either because of material shortages or for other causes — the dealer's share may then not equal his allotment. When this happens, Pontiac has a solution. Shipments of available cars are then made on an equitable basis and if a dealer is short one month the shortage is made up the following month. Also, if the dealer receives an overage for any given month, deduction will be made the following month.

Obviously the distribution problem of auto manufacturers has been more pressing since the war than at any period in the industry's history. The problem will vanish, when demand and supply of cars are again in balance. In the meanwhile, this system has been found both efficient and effective in distributing available cars to thousands of car-hungry Pontiac buyers.

ANOTHER interesting innovation by Pontiac is the use of a new reconditioning kit which enables Pontiac dealers to renew the appearance of used cars at comparatively low cost.

Rundown interiors and rusty chrome have always been a problem to automobile dealers. In the past the dealers usually gave the inside of the car a lick and a promise and let it go at that. Today the problem of car interior and rusty chromium is more serious since most used cars are five or more years of age.

Tested both at the factory and by a large group of dealers the Pontiac used car appearance kit is said to contain enough material to recondition the interior and renew the chromium of ten average used cars at a cost of about $6.00 per car for materials only.

In reconditioning used cars, Pontiac dealers first wash the car, clean the motor and undergear, tuneup the engine and make any mechanical repairs that are necessary. Next dents, scratches and rattles in the exterior body are removed. Tires are checked and the car is cleaned and polished. Then comes the interior "face-lifting."

If the rubber floor mat is badly worn, the Pontiac dealer provides a patch and applies a new plastic dye in black, brown or taupe from his reconditioning kit. For cracked and worn steering wheels, the kit supplies steering wheel putty and paint. If the headlining is dirty, upholstery cleaner will renew it. If there are holes in the upholstery a patch may be applied using a new all-purpose adhesive. Then the headlining is covered with a very fine application of Flock, a fine fuzzy textile material for renewing the interiors of trunks and other interior surfaces. Flock is applied with a Flock gun, spraying first the adhesive and then the Flock itself.

A new upholstery spot remover in the kit is said to leave no rings. If upholstery is faded a new special tint liquid—in taupe or blue—may be added to the cleaner. If the carpeting is badly faded, a new plastic dye can be sprayed on by

the dealer and if the carpet is beyond repair the kit provides new carpeting.

Particularly interesting is the renewal of cowl trim boards and dash insulators with Flock, plastic dye and patches if necessary. The Pontiac reconditioning kit also provides a new quick graining treatment for garnish mouldings around doors and windows. Instrument panels can be renewed by a quick graining treatment followed by "Quick Gloss."

In the trunk, an all-purpose adhesive serves to re-cement a loose lining. If there are holes in the lining, patching is easy and an application of Flock completely restores the appearance of the trunk. Colored plastic dye can be used to restore a faded carpet.

On the outside of the car, rusted chrome bumpers and grille are restored by what Pontiac calls its Bak-O-Chrome method. In some cases only the use of chrome cleaner and polish is necessary. However, in older cars a new finish is said to be provided by the Bak-O-Chrome method.

The chrome renewer is reported to be a comparatively recent development which is not yet widely used in the trade. After removing all dirt a chromium liquid having about the consistency of varnish is applied to the part. This is permitted to dry for a minimum period of 10 min or as long as overnight. Next a chromium powder is applied with a powder puff. A torch is then used which melts both the liquid and the powder, thereby facilitating diffusion. The net result of this treatment is that the bumper or other chromium plated parts are said to take on a bright hard finish that results in a marked improvement in appearance as well as providing protection against corrosion.

Pontiac is holding a school at the plant for 2 days this week to demonstrate the effectiveness of its used car reconditioning program. The entire program has been planned so that unskilled labor can be taught quickly to perform the operations recommended by the company, a Pontiac official explained.

Kaiser-Frazer Presents Its New Luxury Sedan

Detroit

• • • **Kaiser-Frazer** introduced its new luxury sedan this week when the new Frazer Manhattan was shown to a select group of representatives of the press.

The new models stress luxurious interiors and are available in color combinations featuring Wedgewood blue, Linden green, Teal blue, metallic Hickory brown, Doeskin warm gray and metallic Gunmetal.

Chrome trim has been used subtly in the new Manhattan. A wide chrome rocker panel, trunk lid strip, door and window trim have been employed. The car has extra large wheel hubs and rims and chrome-trimmed windshield and window moldings. Assist handles have replaced the conventional straps in the rear of the front seat. A newly designed steering wheel and chrome trimmed instrument panel are used.

Pilot models have been shown at the Willow Run plant to K-F distributors and delivery of the first 3000 units is scheduled for April, according to Joseph W. Frazer, president of the company. Other body details and engine are the same as in the Kaiser Special and Frazer lines. The factory list price of the Manhattan is $2550.00.

Chrysler Corp. Reports Earnings of 18.8 Million

Detroit

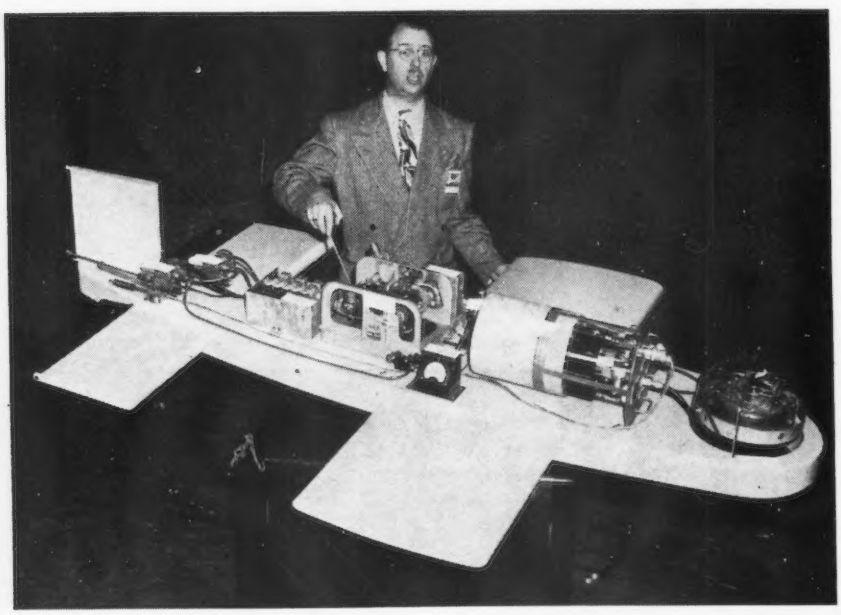
• • • **K. T. Keller,** president of Chrysler Corp., has reported the total business of the corporation in 1946 aggregated $870,000,411 with net earnings of $18,889,289 before expected recovery of excess profits taxes. Net earnings of $26,889,289 after recovery of excess profits taxes are available, Mr. Keller said.

The profits of Chrysler Corp. in 1946 were equal to 3 pct of total sales and earnings per share for 1946 were $6.18. Wages amounted to 24 pct of sales and dividends to 1.5 pct of sales, the report said.

During 1941, which was the last full year of automobile production, Chrysler showed sales of $888,366,410 and a net profit of $40,114,420 or 4.5 pct of sales. In 1945 the net profit was $37,464,624 or $8.61 a share.

The Chrysler Div. sold a total of 677,379 vehicles in 1946, including Plymouth, Dodge, DeSoto and Chrysler passenger cars and Dodge trucks, as compared with 1,028,130 vehicles in 1941.

THE GUIDED LOON: *Electronic equipment and controls of the Loon, a navy guided missile are pointed out at a New York exposition by Thomas Gentel of the Naval Research Laboratory, Washington, D. C.*



Yes, there are lots of reasons why women really go for clothespins like this, made from gleaming Carpenter Stainless.

These pins really hold tight, keep the clothes on the line. No more split or broken pins . . . no more splinters to damage her pet pair of nylons. Plus the fact that Stainless always stays clean!

From your own standpoint, this story of Stainless clothespins shows how you can give your products the utility and sales appeal that come with Carpenter Stainless. And you can do it equally well if your product is in the luxury class . . . or if it sells for less than a dime. (These clothespins retail for only 30c a dozen!) Ever since the days when the first Free-Machining Stainless bars and bright ductile Strip were developed in Carpenter's laboratory, we have been helping Stainless users "turn it out faster and at less cost". To put our experience to work, drop us a line.

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Strength
Rigidity
Heat Resistance
Corrosion Resistance
Longer Product Life
Sales Appeal

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the dealer and if the carpet is beyond repair the kit provides new carpeting.

Particularly interesting is the renewal of cowl trim boards and dash insulators with Flock, plastic dye and patches if necessary. The Pontiac reconditioning kit also provides a new quick graining treatment for garnish mouldings around doors and windows. Instrument panels can be renewed by a quick graining treatment followed by "Quick Gloss."

In the trunk, an all-purpose adhesive serves to re-cement a loose lining. If there are holes in the lining, patching is easy and an application of Flock completely restores the appearance of the trunk. Colored plastic dye can be used to restore a faded carpet.

On the outside of the car, rusted chrome bumpers and grille are restored by what Pontiac calls its Bak-O-Chrome method. In some cases only the use of chrome cleaner and polish is necessary. However, in older cars a new finish is said to be provided by the Bak-O-Chrome method.

The chrome renewer is reported to be a comparatively recent development which is not yet widely used in the trade. After removing all dirt a chromium liquid having about the consistency of varnish is applied to the part. This is permitted to dry for a minimum period of 10 min or as long as overnight. Next a chromium powder is applied with a powder puff. A torch is then used which melts both the liquid and the powder, thereby facilitating diffusion. The net result of this treatment is that the bumper or other chromium plated parts are said to take on a bright hard finish that results in a marked improvement in appearance as well as providing protection against corrosion.

Pontiac is holding a school at the plant for 2 days this week to demonstrate the effectiveness of its used car reconditioning program. The entire program has been planned so that unskilled labor can be taught quickly to perform the operations recommended by the company, a Pontiac official explained.

Kaiser-Frazer Presents Its New Luxury Sedan

Detroit

• • • **Kaiser-Frazer** introduced its new luxury sedan this week when the new Frazer Manhattan was shown to a select group of representatives of the press.

The new models stress luxurious interiors and are available in color combinations featuring Wedgewood blue, Linden green, Teal blue, metallic Hickory brown, Doeskin warm gray and metallic Gunmetal.

Chrome trim has been used subtly in the new Manhattan. A wide chrome rocker panel, trunk lid strip, door and window trim have been employed. The car has extra large wheel hubs and rims and chrome-trimmed windshield and window moldings. Assist handles have replaced the conventional straps in the rear of the front seat. A newly designed steering wheel and chrome trimmed instrument panel are used.

Pilot models have been shown at the Willow Run plant to K-F distributors and delivery of the first 3000 units is scheduled for April, according to Joseph W. Frazer, president of the company. Other body details and engine are the same as in the Kaiser Special and Frazer lines. The factory list price of the Manhattan is $2550.00.

Chrysler Corp. Reports Earnings of 18.8 Million

Detroit

• • • **K. T. Keller,** president of Chrysler Corp., has reported the total business of the corporation in 1946 aggregated $870,000,411 with net earnings of $18,889,289 before expected recovery of excess profits taxes. Net earnings of $26,889,289 after recovery of excess profits taxes are available, Mr. Keller said.

The profits of Chrysler Corp. in 1946 were equal to 3 pct of total sales and earnings per share for 1946 were $6.18. Wages amounted to 24 pct of sales and dividends to 1.5 pct of sales, the report said.

During 1941, which was the last full year of automobile production, Chrysler showed sales of $888,366,410 and a net profit of $40,114,420 or 4.5 pct of sales. In 1945 the net profit was $37,464,624 or $8.61 a share.

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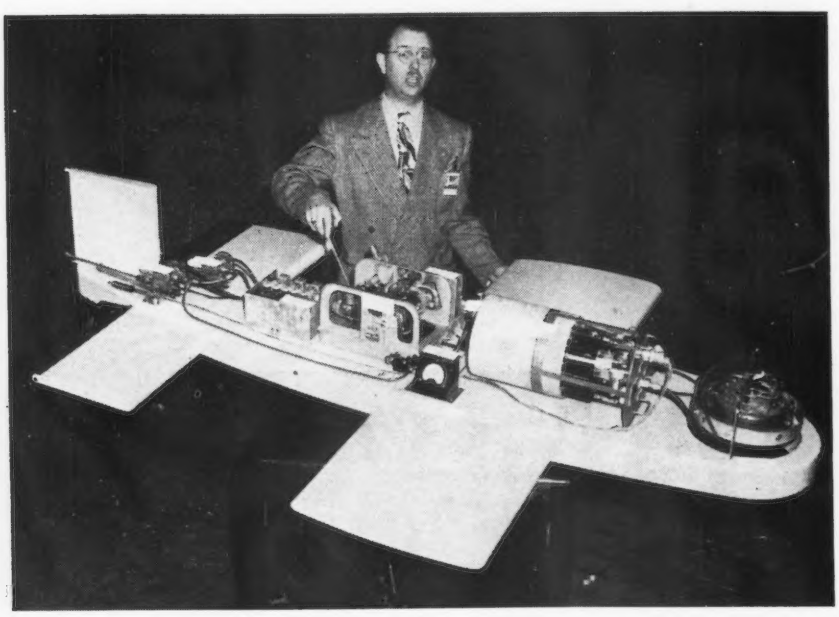

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Washington . . .

L. W. MOFFETT

• Guaranteed annual wage study considered too narrow in its economic implications . . . President at OWMR's suggestion orders it broadened by CEA.

WASHINGTON — Completion of the long-awaited government study of guaranteed annual wages under the direction of Murray W. Latimer has failed to bring the satisfaction expected by some theorists who continue to advocate legislative nostrums for all economic ills.

In submitting the Latimer report to the White House, OWMR's Advisory Board made no such recommendations; instead, it advised the government to avoid any attempt to enact laws looking to establishment of guaranteed wages or work throughout industry.

Guaranteed wages or employment, the Board said bluntly, are in themselves a good thing, much to be desired, and would mark a long step forward in stabilizing economic conditions. But in the Board's opinion, in order to be effective, such plans must be worked out in conformance with the peculiar conditions surrounding specific industries and, in many instances, particular businesses and plants.

This opinion is in substantial agreement with the preliminary findings of the Brookings Institute which is making its own independent survey. The Institute holds that should industry be placed under the legislative obligation to carry its labor on a guaranteed basis, it could only be expected to react by resisting additional business that would require taking on new employees.

While elimination of mass hiring and firing for the rush seasons might be a boon within some industries, it would be no solution for the worker hunting his first job nor for those whose livelihood depends on splitting his services between two or more partially seasonal occupations. Also, overtime for the guaranteed worker when business is active could reasonably be expected to increase prices, temporarily at least; on the other hand, slack periods might tend to bring on intense price-cutting campaigns in order to maintain operations.

ACCORDING to the Advisory Board, the only realistic way to approach the problem of establishing guaranteed work (wage) plans is through sessions at the collective bargaining table where all phases and problems of the particular industry or business can be studied and discussed. Both labor and management have a big stake in work stabilization and the Board implies that it would be very shortsighted indeed for either of the two groups to refuse to consider with the other any plan which might be advanced along this line.

As its contribution toward this end, the Board is including as part of its full report a description and classification of a number of such plans which have been garnered by the Bureau of Labor Statistics. The report itself will be generally available about the first of April and labor groups interested in guaranteed wage and work plans may learn a great deal about both the benefits and the difficulties involved in setting up such plans.

From study of the plans now in effect, it has been found that in general they are operating at a maximum cost of about 1 pct of the total payroll, which is considerably less than the contribution to the government's unemployment compensation pool. For many of the industries or businesses which furnish stable or year-round employment, it is believed that for the 1 pct, plans could be worked out that would provide a minimum income of 75 pct for nonwork periods and a 90 pct average for the year.

While the Board opposes any overall new legislation, it urges studies of the existing laws with a view to ways and means of tying-in guaranteed wage plans for the more seasonal industries with the present so-called social security system. It is admitted, however, that this would involve amending the present structure.

WHILE it may be a step in the right direction, the present system falls far short of providing security for those it is supposed to benefit; benefits are usually too small to permit a worker to step out at 65, or to support his family during temporary periods of unemployment.

In its most recent report, the Social Security Board finds that the average worker (covered by unemployment compensation) has a lay-off period 1.3 times a year; in most instances, a waiting period of two to three weeks ensues before benefits begin. In the vast majority of cases, the checks amount to less than half the average wage prevailing in the industry.

Under the present system, checks usually cease with the acceptance of a part-time job, or even a single day's work. It is felt that by amending the law, with proper safeguards, it might be possible to coordinate unemployment compensation with guaranteed wage plans in certain types of industry. Each would contribute a specified percentage of the worker's wage so as to provide perhaps as much as 60 to 75 pct of his regular pay rate during the lay-off period.

Meanwhile, as has been pointed out in THE IRON AGE, the President is having a broad study made on the Latimer report. Upon the recommendation of the OWMR Advisory Board, the Council of Economic Advisers and the Secretaries of Labor and Commerce were told by Mr. Truman to make a careful analysis of the Latimer report for the purpose of determining the eco-

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NOR does one campaign on a new bottom prove its serviceability.

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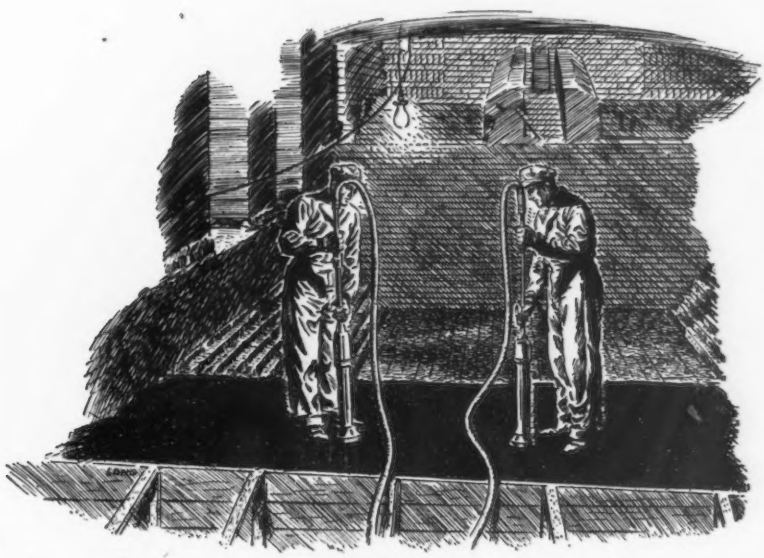
A report has just arrived of the excellent service rendered by the first full hearth constructed of RAMSET, successor to B.R.I.'s Ramix—"Delay time 9½ minutes beyond bogey of 40 minutes, in 198 heats". This and other early reports are substantiating what laboratory and service tests so clearly indicated—that RAMSET, made from the same stable, hydration-resistant magnesia clinker as Ramix, is superior to the latter in workability, strength and refractoriness.



Basic Refractories Incorporated **845 HANNA BUILDING, CLEVELAND 15, OHIO**

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nomic implications of the guaranteed annual wage. The greater part of the study will be made by the CEA, which is headed by Dr. Edwin G. Nourse. Dr. Nourse was directed to study the guaranteed wage as a "device for helping to stabilize employment, production and purchasing power."

SENATOR BYRD'S effort to eliminate or at least reduce Federal subsidies likely will get nowhere. They represent too many votes that elect members of Congress. Moreover, beneficiaries of subsidies, who originally say they do not want them for one reason or another too often first hate, then endure, and finally embrace them. They have spread like an infection from one source to another until it appears that the United States has become a government by subsidy. Once fixed it is rare that a subsidy is removed and instead of saving taxpayers money as subsidy proponents claim, they have become a heavy burden—$43 billion during the 1934-1946 period, according to the Joint Committee on Non-essential Expenditures.

The claim that subsidies save taxpayers money is based on the point that they bring in additional production. The additional supply, it is argued, holds down prices that would otherwise prevail.

THE Byrd report, however, has the following to say of the purposes and criticism of subsidies:

In the past decade or more, subsidies have been used for a number of different purposes, some of them remote from the reasons for their origin. They have been employed to meet higher transportation costs, to compensate for rises in the cost of raw materials to processors while retaining retail price ceilings, to stimulate output by raising producers' prices while holding the retail ceiling, to obtain high-cost output without the necessity for raising the price on lower-cost supplies, and to roll back retail prices in order to reduce the pressure for wage increases.

The cost of Federal subsidies—over $13 billion in 13 years—in itself has been a major factor in the criticism which has been made of subsidies. In addition, it has been charged that recent subsidies disrupt the producer-consumer relationship in attempting to encourage the consumption of goods where there is a surplus and in attempting to encourage the production of goods when the supply is inadequate. Critics have charged that they delay the correction of the basic economic maladjustments which originally created the demand for them. They have also been accused of being undemocratic and paternalistic, the argument running that in granting or withholding subsidy payments the Federal Government could exercise the power of life or death over certain producers or industries.

A bit of irony followed the exhaustive report of the committee, and is accepted as an indication that Congress will pay little if any heed to the report. This indifference was shown on the day after the report was submitted to the Senate by the Virginia Senator.

Just as if there was no such a report with its warnings of danger of the enormous costs of subsidies, the House voted 243 to 110 to extend 6 months (or to the end of the present year) the so-called farm-labor subsidy. The cost will be an extra $10 million with prospects that it will be continued next year. Republicans and Democrats alike supported the bill as Democrats had a gay time taunting Republicans, who, the Democrats said, have talked so much about economy and have done little or nothing in that direction up to this time.

THE farm-labor act was a war measure. In 1944 there was an appropriation of $113,100,000 to subsidize or supplement manpower for farmers by importing labor at an average cost of about $250 for each man imported. Much of the labor, according to agriculturists who used it, was much below par from a point of production. Many of the imported laborers worked hard to see how much work they could escape.

This program is under the jurisdiction of the Dept. of Agriculture and was considered necessary because farms, just like many industrial plants, had been pretty well depleted of labor because the youth of the land was in the armed services.

Now, however, it is claimed that there are many unemployed farm laborers, who do want to go back to the farm, but prefer to join the 52-20 club or live on other forms of government compensation.

Yet in the face of this situation, the subsidies are to be continued.

THE BULL OF THE WOODS — BY J. R. WILLIAMS

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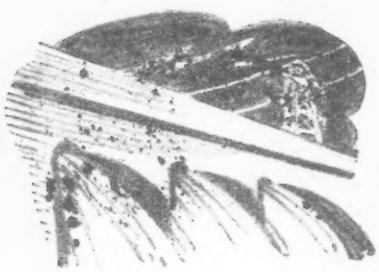
West Coast . . .

ROBERT T. REINHARDT

• Business and industrial management face their problems in conference . . . Higher production costs here than in the East and freight rate handicaps cited as barriers to be overcome.



SAN FRANCISCO—Pig iron, scrap, steel sheets, copper wire and sundry other basic materials may be short on the Coast, but there is certainly no lack of optimism about the immediate and long-range future among industrial leaders.

During a 1-day meeting, 500 top executives of business and industry gathered for the Northern California Management Conference to discuss their problems and hear nationally known experts offer solutions.

In a comprehensive talk titled "The Honeymoon is Over," Morris B. Pendleton, president, Plomb Tool Co. of Los Angeles, stated the position of western industry in relation to eastern competition and pointed to untapped opportunities.

Indicating the handicaps under which some western concerns were operating, Mr. Pendleton said:

"One fact that is shocking to a good many western manufacturers who have had all the business they could handle in recent years, is the fact that they cannot compete with the East on many products. I have in mind an electrical manufacturer in Los Angeles who has a plant in Connecticut making the identical product there. He can manufacture cheaper in Connecticut than he can in Los Angeles. My own company has a plant in Chicago that can make certain comparable products 20 pct to 30 pct less expensively than we can make them in Los Angeles because of saving in freight and steel, and because of certain classes of available help. We bought a plant in Jamestown, New York, because in that little manufacturing community, they made good tools at such low costs over so many years that we couldn't begin to start from scratch out here and compete."

Whether establishment of branches of eastern manufacturers here is desirable from a long-range view is frequently debated by professional and amateur economists. Mr. Pendleton strongly favored such developments, especially if they manufacture products not otherwise produced here. Pointing out the advantages that branches of eastern plants which locate here have right from the start, the speaker stated that their operations have the benefit of experience and established techniques and that their "know how" is perfected whereas the newly developed western manufacturer must start from scratch in a competitive market and usually without previous experience in production except under wartime conditions. In the opinion of Mr. Pendleton, eastern branches are preordained to success whereas infant western industries must pass through many childhood ailments before they reach maturity.

ANALYZING the overall industrial situation on the Coast, the speaker said:

"The war has advanced the industrialization of the Pacific Coast by 50 years. It has placed us on the crest of a gigantic industrial wave. Only the astuteness of aggressive western management, represented in this room, and willing to learn as exemplified by your presence, can keep us on the crest of that wave.

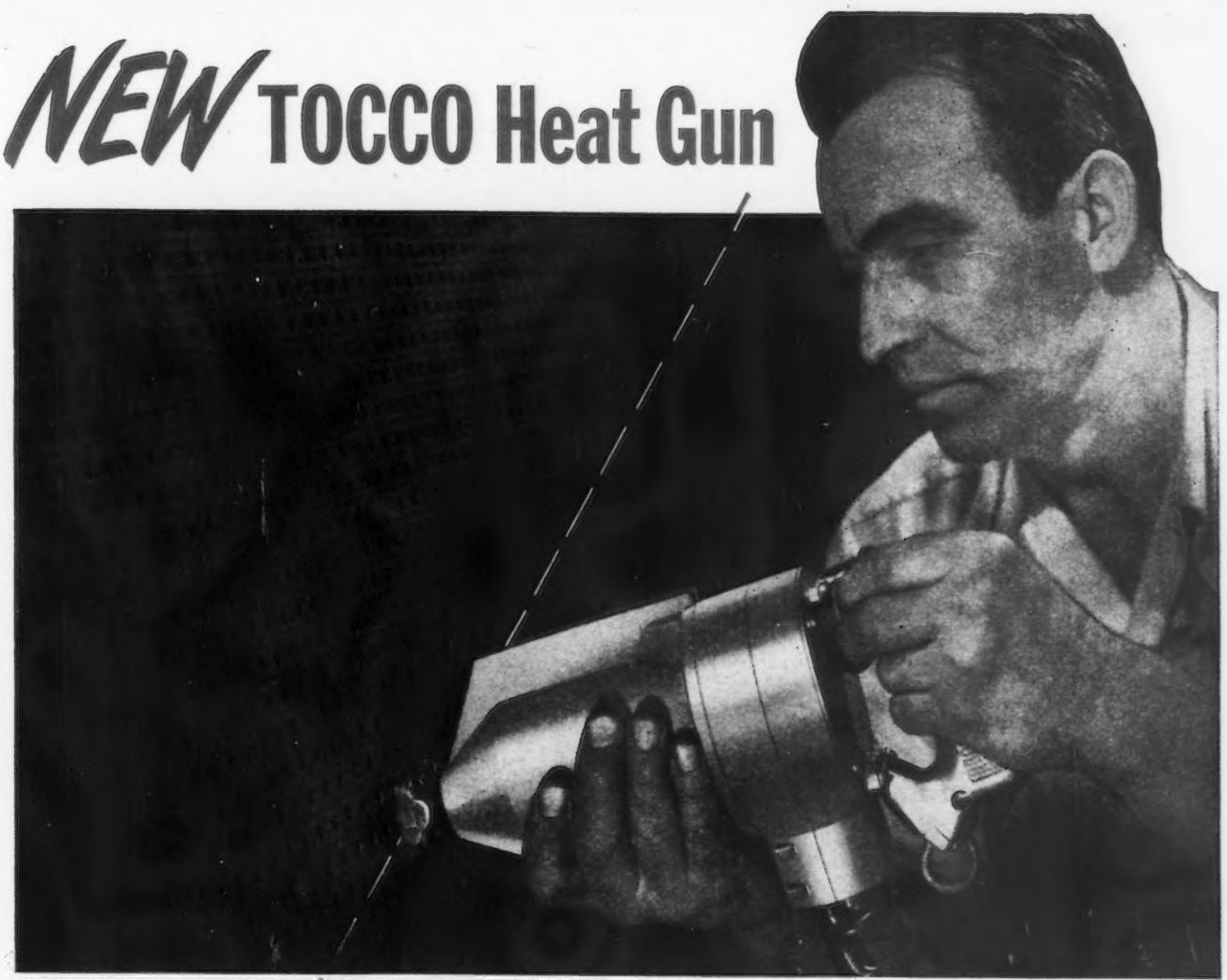
"During the war our pessimistic cry-babies spread fear and uncertainty about the future of jobs in California. They claimed that our new industries were nothing but a war bubble. How wrong they were. In 1939, we employed in California factories a little over 400,000 workers. That number had been increasing continually and it was obvious that our industrial employment was on the up-grade. But that trend skyrocketed when war occurred. Due to the aggressiveness and ingenuity of our manufacturers, billions of dollars in war contracts were placed in California. At the peak of 1943, 1 million people were employed in manufacturing. At certain phases of our war work, we recognized much of it could not possibly carry over into peacetime, but we in industry recognized that a substantial part of that industry was here to stay—and to produce successfully even in civilian competition. After VJ-Day, factory production dropped sharply. But did it drop back to prewar days? No indeed!

"At the lowest point in our industrial employment after VJ-Day —just a year ago in February, we employed 625,000 workers, or more than 50 pct more than in 1939. That was the bottom. And you can remember that even then, we could have employed more people if more people had been willing to work. You will recall the scandal of people being encouraged to take vacations at the expense of our unemployment compensation fund. You can recall that requisitions to USES brought very unsatisfactory results.

"But here we are in 1947, and what has happened in this past year? In February 1947 we employed 719,000 in our factories, 94,000 more than a year ago in February 1946. In just 1 year we have increased jobs in factories nearly 15 pct.

"THE industrial development sub-committee of California Manufacturers Assn., sponsored the Ford Motor Co. parts purchasing exhibits. The purpose of this industrial development sub-committee is to bring more business into those factories which are already in California. Yes, we also want to encourage more branch plants coming here, but we should encourage them when adequate facilities do

NEW TOCCO Heat Gun



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not already exist in this area. We should encourage the establishment here of branch plants to manufacture products that are not already manufactured in California. For example, why shouldn't we have airplane propeller factories in California. A substantial number of the propellers made are used by our outstanding aircraft manufacturers. It might even be in time, that we should have our own automobile and airplane engine factories in California. These are the kinds of new plants which we should encourage. Therefore, the industrial development committee's program, which is now in the planning stages, will comprise three major parts:

(1) To secure more production contracts for items used in California
(2) To encourage the creation of facilities which do not otherwise exist generally for the production of the items used in California
(3) To develop means for encouraging additional sales of products manufactured in California.

"Along these lines we are initiating a program to cover the first phase of these activities. We are determining, from each large national manufacturer, what kind of products, and how much in dollar volume, they would be willing to buy from California manufacturers if those products can be produced competitively.

"We also believe it time to consider whether the State of California should establish a Dept. of Commerce. The Dept. of Commerce might coordinate and provide the facts necessary to assist business here in producing and distributing California-made products to the greatest degree possible—and when I say 'California-made products', let me emphasize very clearly that we do not propose any trade barriers. We believe every company which manufacture in California is a part and parcel of the California community. A branch plant can provide just as many jobs as a local plant. There is no difference in the responsibility to the community, nor is there any difference in our pride of having such plants in our state.

"We do not want more regulatory bodies, and we do not propose that the California Dept. of Commerce be a regulatory body. We do believe, however, that through revenue bonds without cost to the taxpayers, that a State Dept. of Commerce would be the suitable agency to coordinate this program. It is the proper function of state government to protect the funds invested on behalf of the people.

"What concerns me is to keep our present 719,000 workers in our factories busy.

"We must think through the freight rate situation very carefully, because it is a two-edged sword. It enhances the advantages of the branch plants who can ship raw materials out here unassembled for Pacific Coast assembly. On the other hand, it boosts the costs of California manufacturers who must export Eastbound.

"When the big flat percentage increases in freight rates went into effect these rates started a movement toward economic islands within the United States. These increases placed an average of 17.6 pct more cost on top of a 6 pct wartime rate. Thus existing inequities were made into even greater inequities.

"But the flat increases forced certain great economic changes—some, of great short-range benefits to concerns manufacturing for local consumption; others, great hardships on California factories selling in the East. These rates are causing the greatest production decentralization in history. Plants here are getting business formerly done in the East because the cost of getting the goods from the East to the Coast is impossible. Similarly, plants here which do substantial business in eastern markets are having to consider putting branch plants in the East.

"THIS places severe responsibilities on California manufacturers, because we are inexperienced in the terms of our eastern competitors with 25 to 100 years of manufacturing experience. We have the highest hourly wage rates in the nation. This is amply documented in so many sources as to be indisputable. Our economy will be stronger and our purchasing power greater if we can obtain more work from our labor at their higher hourly rates. Hourly rates and productivity are relative terms.

"On the Pacific Coast, a building boom is underway. I happen to sit on the Civilian Production Administration Board for Region 8, covering southern California. We presently run 500 cases through the shop each week at an average of $10,000 a case, or $5 million a week. We have approved $170 million of nonresidential construction, and denied $127 million. Most of these denials are still in our backlog. We know of $125 million of volume that has not even been filed. We know that the movies have a $26 million building program that hasn't been filed. This is all good backlog to help in the post honeymoon period. I do not have the figures for your region but assume they are in proportion. Unfortunately, however, the high cost of building has caused more firms in northern California than southern California, to shelve temporarily their plans to build or expand plants.

"General Electric Co. bought a 57-acre factory site in San Jose in 1944 with the intention of building there at war's end, but has yet to break ground for the project. It is reported that they await a softening of building costs.

"Garwood Industries deferred for at least a year an estimated $500,000 San Francisco plant expansion program 'because of the high cost of material and labor,' says a trade journal.

"Southern Pacific Railroad has stopped all construction except maintenance work. High costs played a big part in the decision.

"Pacific Coast management is at the crossroads. Nothing succeeds like success. Since California has been the national example of success in almost every sphere of activity, I predict that we will successfully pass through this honeymoon period. I am not pessimistic. I am optimistic."

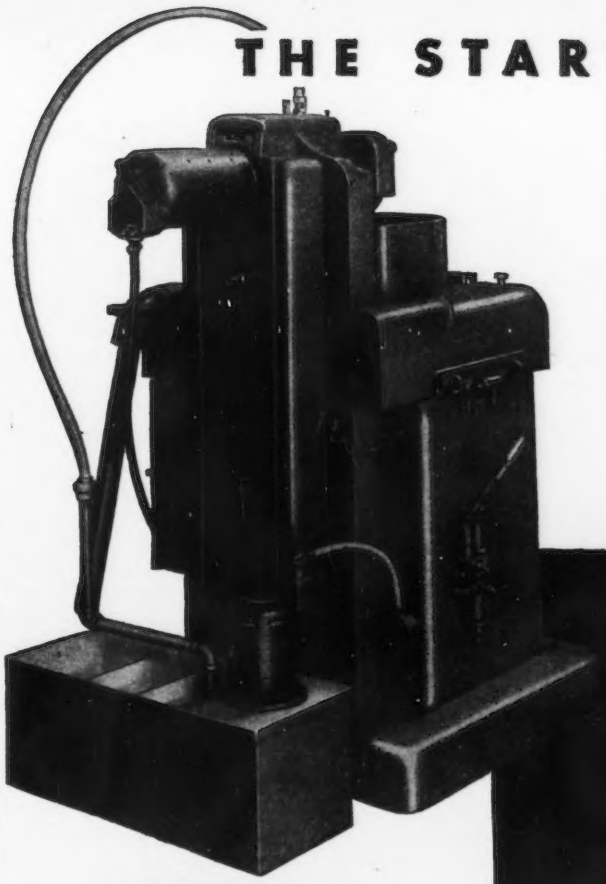
Lifts Trade Regulations

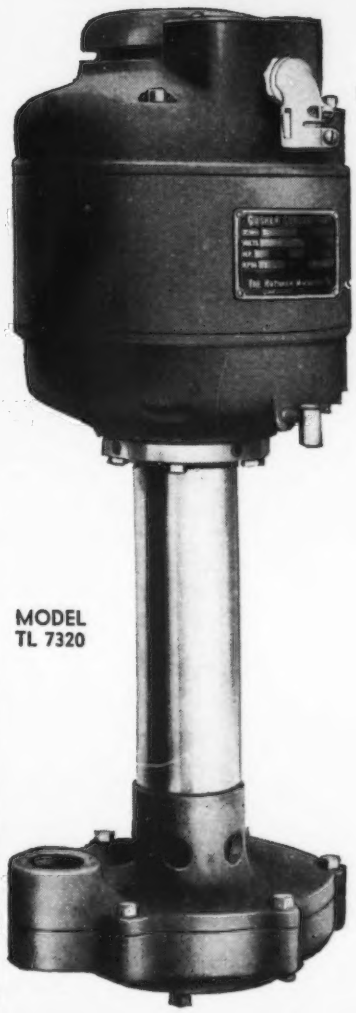
London

• • • **Britain's Board** of Trade has announced that the Trading with the Enemy Regulations preventing United Kingdom firms from trading with Germany have now been lifted. This step was timed to coincide with similar action taken by the United States, and permits the resumption of private import trade from the British, American and Russian zones into the United Kingdom. Imports into the three zones will for the time being be solely on government account.

THE START OF A . . .

GOOD COOLANT SYSTEM





MODEL TL 7320

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Illustrated above left is a *Model 1-P3 Long Gusher Coolant Pump* on a *Taft Peirce #6 Rotary Surface Grinder.* To the right is a *Model 1-P3 Short Gusher Coolant Pump* on a *Hardinge DSM59 H.S. Precision Second Operation Machine.*

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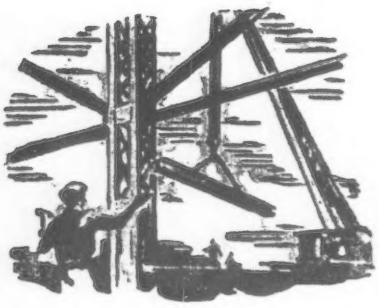
1821 Reading Road **Cincinnati, Ohio**

European Letter . . .

JACK R. HIGHT

• U. S. representatives in England push plans to export 3 million tons of coal a month . . . Reports Poland may ship 5 million additional tons to Western nations.



LONDON — The removal of the threat of a coal strike in the United States has come as a reprieve to the European countries which depend on American exports for large parts of their coal supplies. The welcome place offered to America as the largest postwar coal exporter was somewhat dimmed by the frequent threat of a strike that might interrupt shipments. After the experience with two such strikes last year, most people here took a fatalistic attitude, thinking that another stoppage would be about the worst thing that could happen, and therefore was to be expected.

With the strike threat removed, American representatives here are going forward with plans to push monthly coal exports up from the previous level of 2 million tons per month to a level of 3 million if possible. The shipments during March are expected to total 2.6 million tons, and the program for the second quarter is likely to remain at about that figure. If the 3 million ton figure is reached, it will probably occur during the last half of the year.

With restrictions on the shipment of higher quality coals from the United States being lifted at the end of March, all of the European consumers hope that they may be able to buy some better fuel than they have been receiving in the past. The only serious deterrent to the coal exporting program barring a work stoppage is the advent of a serious dollar shortage, but it is hoped that the new turn of American foreign policy will make it more easy for the poorer Continental countries to get American coal when their dollar reserves are exhausted. Whether the American Government sees fit to grant a number of "loans" which may finance the exporting, or some other system is developed, aid must come.

The news from Moscow that Poland is to be relieved of 50 pct of its contractual responsibility for exporting coal to Russia has the European Coal Organization agog. Poland's present known program is to make available about 20 million tons of coal for export this year, of which about 11 million tons will go to Russia, and the remainder to the Western ECO countries. If the report is accurate, the new agreement would mean that perhaps 5 million additional tons of coal would become available for apportionment to the Western nations.

DEPENDING upon the use of conservative or maximum figures, the overall shortage for the European countries this year will amount to at least 15 million tons, and perhaps as high as 28 million tons. Even assuming the latter, 5 million extra tons from Poland will represent a welcome relief.

At this writing I can find no one in London who knows anything more concerning the reduction in Russian demands on Polish coal than they have read in the newspapers. The Polish representative in ECO has had no official word on the subject. It is commonly understood, however, that Poland has been asking Russia for relief, inasmuch as most of the imports Poland requires must come from the West. A Polish delegation is in London now attempting to arrange for the purchase of large amounts of machinery and other commodities needed for reconstruction. Poland has a good case in demonstrating that it must build up hard currency to pay for such imports.

The greatest advantage which the export of coal to Western Europe offers to the Poles is that although it may be possible to ship to an individual nation only a few hundred thousand tons this year, the contract for future delivery makes it possible for the Poles to negotiate a line of credit for several years with the countries receiving the coal.

ECO experts are now studying the transport situation from Poland, as there is some doubt that rail transport will be available for the long cross-hauls through Germany if the additional 5 million tons should become available. The ideal system would be to ship by water from Danzig and Gdynia, but, due to war damage and removals of loading equipment by the Russians, there are insufficient facilities today for present exports.

THE news of coal production in Germany is still uniformly good, with a recent day's output of 235,000 tons setting a new postwar high. The biggest drawback at the moment is in the transport problem, and it is estimated that during the transport breakdown of December, January and February some 2 million tons of coal were dumped on the ground at the pitheads, for lack of transport.

The inland water transport has been completely closed down since the beginning of December, but the reopening of the rivers and canals in the spring will only move 20 pct of the Ruhr coal. A shortage of locomotives and wagons is the most pressing problem that is disrupting the coal movement at the moment.

It seems certain that to avoid a repetition of this winter's blunders there will be some stockpiling of coal in Germany during the summer against winter transport breaks, so a part of the benefits of increased output will be consumed. Some officials state that the coal which is now stocked at the pits may be used for this purpose. The long-established policy of refusing to carry over any backlog of undelivered tonnages from one quarter to the next may facilitate this operation. On the average most consumers of Ruhr coal received deliveries of about 65 pct to 75 pct of their allocations during January and February.

The United States and the European Coal Organization, are both taking an increasing interest in

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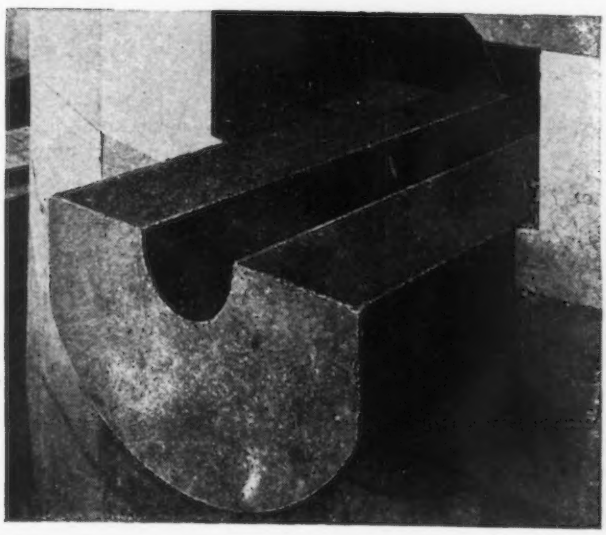

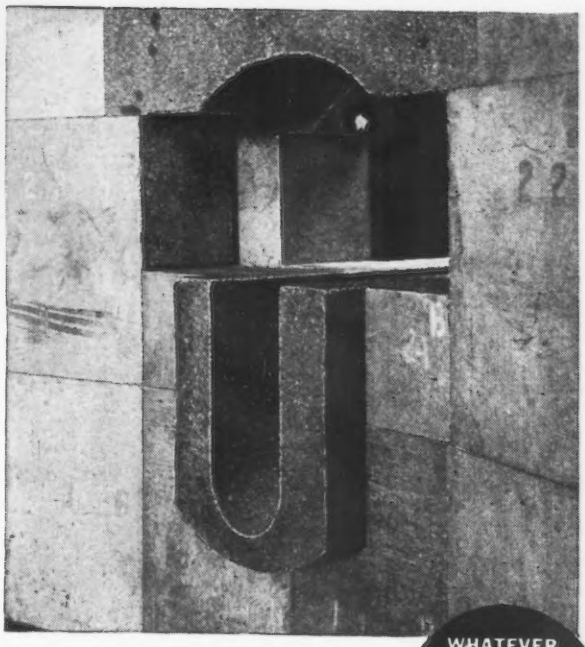

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promoting the long-term reconstruction and modernization of European coal mines, and special effort is being made at present to promote the production of repair parts for the German machines which are in the mines of Belgium, France and Poland. The export of repair parts from Germany is a sore point among the administrators of the British and American zones. They are anxious, as I have mentioned here before, to reduce their deficit in Germany. To this end they have so far refused to send replacement parts for mining machinery out of Germany.

WHAT is contemplated at the moment is that it may be possible for American officials to make the following offer to military government officers in Germany: The North German Coal Control would be permitted to reduce its exports to Belgium and France by a specified tonnage per month, perhaps 50,000 tons. The U. S. Government would undertake to make up that tonnage to Belgium and France in increased exports, providing that military government officials would regard the additional 50,000 tons as a special supply, to be used only for the steel industry, and the steel would in turn be earmarked for the mining machinery industry.

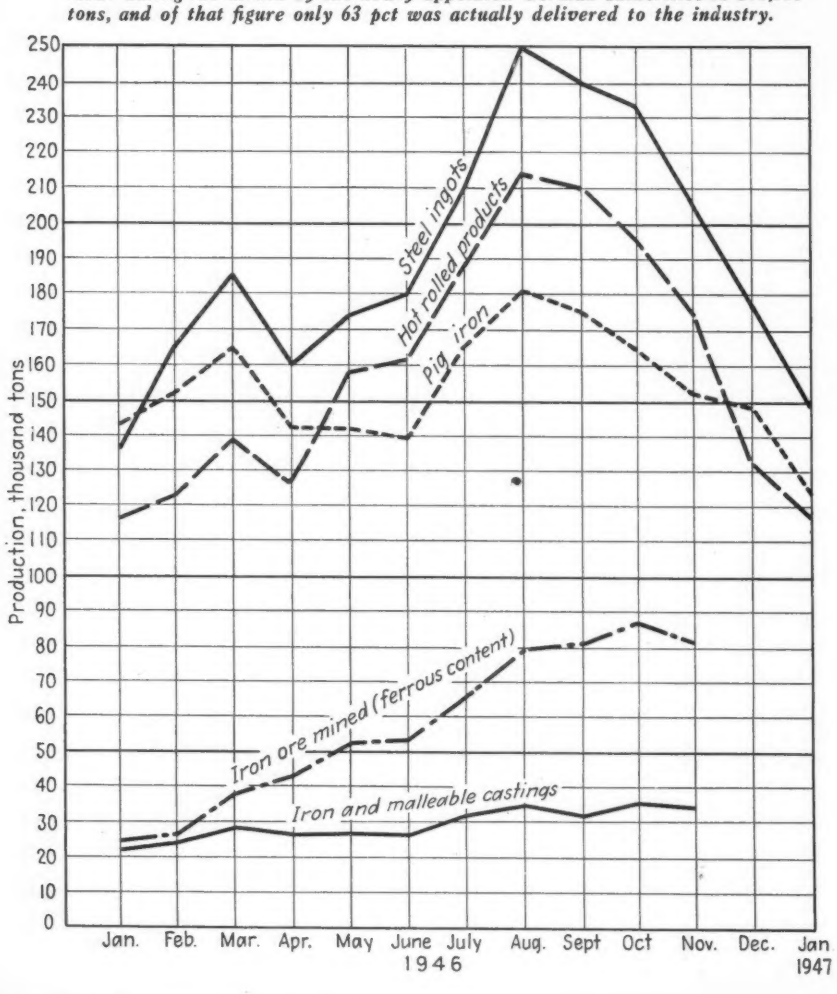
Germany would have to agree in return to export all, or a specified part, of the mining machinery to countries specified by the European Coal Organization. If such international horsetrading gives the impression that things in the coal business are tough, that is right.

Military government would have to do a much better job of handling the German coal allocations officials than it has done in the past few months, if such a system were to be a success. British officials hoped to work out some such deal last autumn when, despite protests from those countries, shipments to France and Belgium were reduced. It was hoped then that a substantial increase in steel output would expand the output of mining machinery, but just when the coal became available the higher powers decided to let the Germans handle their own internal coal allocations, and they frittered the added tonnage away here and there so there was no short-term advantage at all.

It is expected, however, that in the future the British officials will do a more specific job of "advising" the Germans on their coal allocations, so that past mistakes may be avoided.

Some officials both inside and outside Germany are disturbed at the ease with which some industries such as porcelain and optical instruments get their essential materials, for products which are to be sold to the PX, and sometimes to its British counterpart, the NAAFI. At the same time, due to a lack of a high priority or the absence of a coordinator with some gangster blood in him, it is just impossible to get materials for much more fundamental programs.

WINTER HITS GERMAN OUTPUT: *Output in the German steel industry has fallen off sharply and was drastically hit in December and January due to the paralyzing effects of winter weather upon transport. Out of 400,000 tons originally allocated to the steel industry for January, a reduction was made during the month by the newly appointed German authorities to 240,000 tons, and of that figure only 63 pct was actually delivered to the industry.*



British Ministry Aiding Research Labs Obtain Scientific Equipment

London

• • • **The British Ministry** of Supply's plan for selling valuable war surplus scientific equipment to scientists, universities and educational authorities in England and war devastated countries is doing much toward helping to re-equip research laboratories whose work has been restricted during recent years through lack of vital technical equipment.

Some months ago many atomic scientists' work was being delayed by lack of electronic equipment. Today, Oxford, Cambridge and other universities are forging ahead with atomic research with the aid of government surplus stores. Many microscopes have been supplied to British Medical Research Council health centers whose work had been hindered through lack of these instruments.

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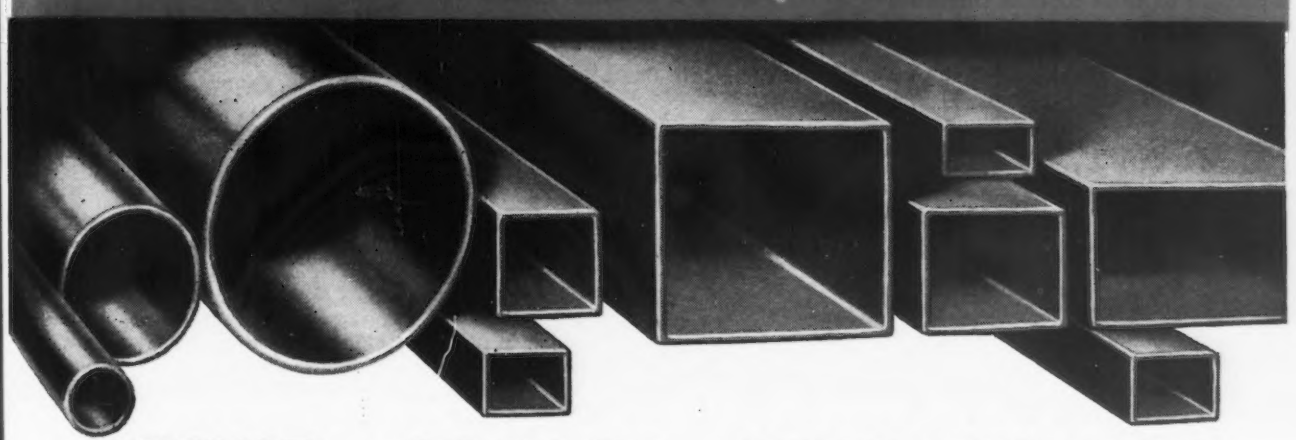

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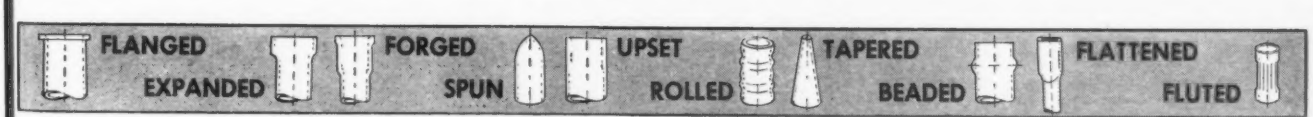

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Dear Editor:

OPEN THE DOOR, JARVIS

Sir:

I am very much interested in the news summary on p. 96 of the Feb. 27 issue particularly in that part which reads as follows: "As evidence of long-term planning, steel salesmen from many major companies for several weeks have been knocking on consumers' doors in an effort to convert them into permanent customers. Likewise every effort is being made to retain newcomers who do not come under the classification of 'old timers.' Emphasis on these contacts surrounds the probable consumer demand in 1948 and little hope is held out for any change in delivery promises during the first half of 1947." As yet none of these steel salesmen from the major companies have knocked on my door regarding orders for 1948 delivery. If you know of these gentlemen or know of the companies which they represent I would appreciate it if you would ask them to come knock at my door.

E. R. SCUDDER
General Manager
Jarvis & Jarvis, Inc.
Palmer, Mass.

● Since they've only started knocking recently, probably they haven't yet reached your door. See the survey, "Many Steel Customers Intend to Change Sources of Supply," in the Mar. 20 issue.—Ed.

FISSION AT BIKINI

Sir:

I have read with great interest the article entitled "Fission at Bikini" in the issue of July 18, 1946, and as I am engaged in research in nuclear physics, would be grateful if you could let me have a reprint of same . . . I see your journal at the National Standards Laboratory where I am a research officer . . .

N. A. FAULL
National Standards Laboratory
Chippendale, Australia

OXYGEN IN OPENHEARTHS

Sir:

The article entitled "Use of Oxygen in the Openhearth Bath" on p. 42 of the Feb. 20 issue was of much interest to us. Would it be possible for us to obtain about seven copies of this article?

L. C. ROSE
Colorado Fuel & Iron Corp.
Pueblo, Colo.

REQUEST FROM SWITZERLAND

Sir:

The article by E. C. Polidor on "Inspecting Turbosupercharger Blades by Optical Projection Comparator" in the Jan. 16 issue is of the highest interest. I am preparing a publication for a Swiss technical review on the use of optical instruments in industry and would like to include some data on the Pant-O-Jector. May I ask that you transmit my letter to Universal Engraving & Colorplate Co., Inc., Buffalo, with the suggestion to let me have photographic copies of Fig. 1 and 9 appearing in Mr. Polidor's article . . . All information supplied would be published with due acknowledgment . . .

N. G. NEUWEILER, M.I.E.T.
Consulting Engineer
35, rue Contamines
Geneva, Switzerland

● Your request has been forwarded to Universal Engraving & Colorplate Co.—Ed.

GOLD PLATED BRASS

Sir:

We have a problem with gold plated brass. Using an electric furnace with a protective atmosphere doing silver soldering, jewelry pieces are run through the furnace three times at 1400°F to solder 18 joints. By the time the soldering is completed, the pieces are so fully annealed that they are too soft to be used. We have tried to work-harden by hammering with a fiber hammer and by forming, with no success. Is there any other way of obtaining hardness in the pieces similar to what they were after coming out of the press? The material used is an 80-20 brass, 1/16 in. sq., 1/20-12K gold plate about 10 in. long bent double to form a bracelet with several findings soldered to it. Is it possible to heat to around 700°F and air cool, and have the piece become hardened? We are now thinking of using beryllium copper. Any information you can give us would be appreciated.

N. K. PETTIGREW
Assistant Service Manager
C. I. Hayes, Inc.
Providence

● Your problem would be solved most satisfactorily by using a material which is heat treatable, since 80-20 brass is not, we are informed. One of the large suppliers of beryllium copper advises that this metal might be feasible for your problem, with a suggested cycle including a quench after furnace brazing, followed by hardening at 625°F, then air cooling. One factor to be considered, however, is the cost of beryllium copper which is approximately six times that of 80-20 brass. Difficultv in forming might also be encountered, although this material comes in different grades of hardness, one of which might be suited to your purpose. We understand beryllium copper has been gold plated. Another suggestion is aluminum silicon bronze which might be heat treated to produce the desired physicals, with tensile strength and hardness the determining factors for its use.—Ed.

INERT-ARC WELDING

Sir:

We are interested in the article, "Inert-Arc Welding," which appeared in the Oct. 31 issue. Will you kindly send us the literature or advise where it can be obtained.

EDWARD S. CHRISTIANSEN
Magnesium Co. of America
Chicago

● Tear sheets of the article which discusses the process are being forwarded. Further information can be obtained from the General Electric Co., Schenectady, whose process is described in the article.—Ed.

ELECTRODE CORRECTION

Sir:

Will you please publish the following brief correction notice: In the Jan. 2 issue, the advertisement of The Champion Rivet Co. Gray Devil No. 2 electrode was listed as a 6013 rod. This was an error as the rod is, in reality, 6012. The Graydac is the Champion 6013 rod.

CRIER ADVERTISING SERVICE
Cleveland

MARKING PROBLEM

Sir:

. . . We have a problem here in our factory, that perhaps you can help us solve. This pertains to the marking of feeler gage stock. We enclose a sample marked .002, which we would like to duplicate, i. e., the etching and markings would be neat and clear and deep such as the sample. Do you have information as to how we can accomplish our marking problem, making our product comparable to the marking per sample?

G. C. TINSLEY
President
Precision Steel Warehouse, Inc.
Chicago

● Best results in marking feeler gage stock we believe would be by the electric engraving method rather than the electro-etch method. The cost is somewhat higher, but the markings obtained are clear and sharp. Hand operated or machine driven metal engraving equipment is available and we are forwarding a list of manufacturers of such equipment.—Ed.

CEMENTED CARBIDES

Sir:

We would appreciate receiving tear sheets of p. 42 to 45 in the Jan. 30 issue, which cover the article entitled "Some Metallurgical Aspects of Cemented Carbides" by John C. Redmond.

A. KIPP
Philips Laboratories, Inc.
Irvington on Hudson, N. Y.

CHINA'S FARM TOOLS

Sir:

With reference to the article "UNRRA Sets Chinese Farm Implement Goal at $21 Million" in the Oct. 31 issue, which I read with great interest, I would appreciate it very much if you will send three copies.

EDWIN L. O'BRIEN
UNRRA Hdqts.
Shanghai, China

THE NEW ARITHMETIC IN STEEL

In production per ton—

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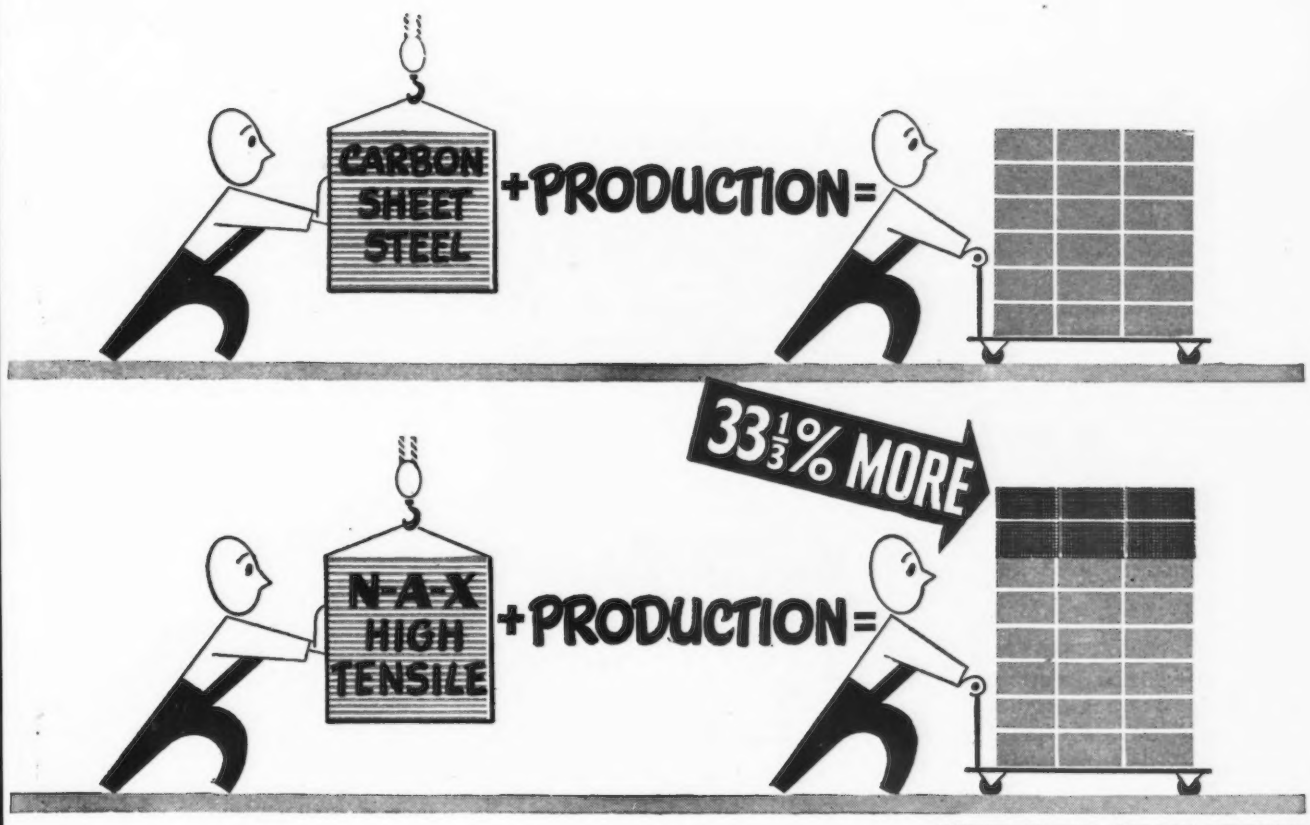

THE new arithmetic in steel is as simple, understandable—and as well worth remembering—as the multiplication tables.

N-A-X HIGH-TENSILE permits the use of lighter sections—as much as 25% lighter. Less steel is used per unit; more units are produced per ton. Yet finished products actually are stronger and more durable—thanks to the greater strength and toughness, the greater resistance to fatigue and corrosion, of N-A-X HIGH-TENSILE steel.

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The tremendous demand for N-A-X HIGH-TENSILE makes it impossible right now to promise normal delivery on new orders. However, our engineers will be glad to show you how to make the most of the new arithmetic in steel in figuring your plans for the future.

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PERSONALS

° ° °

• **Robert C. Schenck** has been elected president of the Duriron Co., Inc., Dayton. **William E. Hall,** former president, has been made chairman of the board.

• **Ralph Haddox** has been appointed assistant manager of the tubular department of Oil Well Supply Co., Dallas, a U. S. Steel subsidiary. Mr. Haddox has been president and general manager of the United Pipe & Supply Corp. of Charleston. In his new position, he will be active in the countrywide sale of tubular products.

• **C. N. Kirkpatrick** has been elected chairman of the board of Landis Machine Co., Waynesboro, Pa. **J. H. Elliott** has been elected president and general manager, and **R. G. Mumma** has been appointed secretary.

• **W. C. Wilkinson** has been appointed purchasing agent of Cribben & Sexton Co., Chicago, succeeding **Carl E. Lyon,** who has retired. Mr. Wilkinson joined Cribben's office staff in 1938. He was promoted to assistant to the president just prior to joining the armed forces in 1941. He resumed association with the company in the purchasing department in 1946.

• **John E. Groves** has been appointed industrial relations manager of the National Radiator Co., Johnstown, Pa. He was formerly assistant to the executive vice-president and industrial relations director of the Standard Steel Spring Co. of Coraopolis, Pa.

• **Ken O. Hood** has been made the new Pacific Coast district manager for the Falk Corp., Milwaukee. With headquarters in Los Angeles, he will direct Falk sales in California, Washington, Oregon, Nevada, New Mexico, Arizona, Colorado, Utah, Idaho and parts of Wyoming. Associated with the company for more than 10 years, he was on the sales staff in Detroit from 1936 to 1943 and most recently managed the Cincinnati district. **Kenneth W. Morrissey** is returning to the Cincinnati post after an absence of 4 years which he spent at the home office on special assignment during the war. Before becoming district manager of Cincinnati, he was in the Los Angeles and Pittsburgh sales district. He has been with Falk since 1928.

• **Olney Broun** has been appointed assistant general superintendent of the Rustless Div. of the American Rolling Mill Co., Middletown, Ohio. He joined the Rustless organization in 1936 as a metallurgist. In 1940 he was named superintendent of the production metallurgical department, and in that capacity has been responsible for the control of metallurgical practices in all plant production departments.

ALFRED J. YARDLEY, president, Jenkins Bros.

• **Alfred J. Yardley** has been elected president of Jenkins Bros., New York, succeeding **Farnham Yardley,** who became chairman of the board, after serving as president for the past 30 years. Alfred Yardley joined the firm in 1932 at the plant in Bridgeport, Conn.

• **Joseph H. Rill** has been appointed personnel director of Twin Coach Co., Kent, Ohio, and its subsidiary, Fageol Products Co. Mr. Rill was formerly personnel director of the marine division of Federal-Mogul Corp. in Detroit. He has also been associated with American Brake Shoe & Foundry Corp. **R. P. Johnston** has been named assistant to the personnel director. Mr. Johnston has been executive secretary to the president.

• **J. C. McGunnigal** has been appointed to the new position of general sales manager of Brainard Steel Div. of Sharon Steel Corp., Warren, Ohio. Mr. McGunnigal has been with the company in various capacities for the last 10 years, just recently having been manager of sales, strip steel division. **Lester J. Lyons,** who for the past year has been in Warren handling steel strapping sales, has returned to his former position as district sales manager of the New York sales territory with offices in New York City.

• **E. A. Schiele** has been appointed representative of the Steel Improvement & Forge Co. in the Chicago area. Mr. Schiele was formerly with the Graver Tank & Mfg. Corp. and prior to that time with Johns-Manville and the Central Scientific Co. **Henry R. Voelker** has been appointed representative in the Indianapolis area of the Steel Improvement & Forge Co. Mr. Voelker has been a manufacturer's agent since 1938 and prior to that served as district manager of the Rotor Air Tool Co., sales representative of the Ingersoll-Rand Co., and was connected with the Pennsylvania R.R. Co. for 15 years.

• **E. P. Feely** has been named national manager of fleet sales for Chevrolet Motor Div., General Motors Corp. He comes to Detroit from New York, where he has been assistant manager of the Atlantic Coast region.

• **Howard A. Hein,** formerly chief sales engineer for the Cleveland Automatic Machine Co., has been appointed manager of the Detroit branch office. He joined Cleveland Automatic in 1930 as an apprentice machinist.

• **Wade B. Houk,** cold rolling department superintendent since 1941, has been made division superintendent of wire mills, American Steel & Wire Co., South Works, Worcester, Mass., to succeed **Harvey R. Rice,** who has been promoted to special assignments on the district manager's staff. **Robert N. C. Hessel** succeeds Mr. Houk as superintendent of the cold rolled division, and **Albert K. Zeitell** has been made superintendent of the round wire department.

A. H. SHONKWILER, general manager, Lackawanna plant, Bethlehem Steel Co.

• **A. H. Shonkwiler,** assistant general manager of Bethlehem Steel Co.'s Lackawanna, N. Y. plant since January 1945, has been appointed general manager. He succeeds the late E. F. Entwisle. Mr. Shonkwiler came to Bethlehem Steel in 1935 from Wheeling Steel Co. as superintendent of the sheet and strip mill at Lackawanna.

• **Norman A. Kelsey** has been transferred from the New York district office of the Central Iron & Steel Co. to be district sales manager of the New England territory with headquarters in Boston. **W. A. Hill** was transferred from district sales manager in the New England territory to the district sales managership in Philadelphia. **Robert M. Schein,** formerly with Wilkoff Steel Corp. and more recently with Marx-Segre Co., has become associated with the company as a member of the New York district office organization, covering the New Jersey territory.

• **Robert A. Neal,** vice-president of Westinghouse Electric Corp., has been named general manager of the company's expanding Pacific Coast operations. Mr. Neal will make his headquarters in San Francisco and at the company's newly acquired plant at Sunnyvale, Calif., formerly operated by the Joshua Hendy Iron Works. He was formerly vice-president in charge of apparatus sales, with offices in Pittsburgh.

• **C. P. Doherty,** a veteran employee of the Despatch Oven Co., Minneapolis, for 27 years, has been made factory manager and **G. L. Schuster** was named chief engineer of the company. These two new officers will also serve on the board of directors as vice-presidents.

• **A. M. Finley** has been appointed development manager of Goodyear Tire & Rubber Co.'s mechanical goods plant in Lincoln, Neb. He joined Goodyear as a chemist in 1929. His entire service has been devoted to research and compounding for the company's mechanical goods division.

• **R. C. Sogge,** assistant manager of General Electric Co.'s general station divisions, Schenectady, has been appointed manager, standards division, and **Lee F. Adams,** standards division manager, has been appointed standards consultant.

• **Theodore M. Caiazza** has been appointed freight traffic manager of the Santa Fe R.R., Chicago. Mr. Caiazza was formerly assistant general freight agent for the railway at San Francisco and succeeds **J. P. Hackler,** who has resigned.

• **Wallace R. Harper,** manager of Pittsburgh Plate Glass Co.'s Boston warehouse for the past 10 years, has been named manager of plate glass sales, succeeding Donald C. Burnham. **William A. Gordon** has been named manager of trade sales. He has been associated with the firm during the past 23 years. After 6 years' service in the sales department, he was named assistant manager of plate glass sales, a position he held until his current promotion. **Marvin W. Marshall,** manager of industrial glass sales, assumes direction of plate and safety glass sales to all production accounts excepting the largest automotive accounts. **Felix T. Hughes** has been appointed manager of warehouse sales. He joined the firm in 1934 and successively held the position of assistant manager at Mobile, Ala., and the managership of warehouses at Columbus, Ohio and Atlanta, Ga. He has been assistant manager of plate glass sales for 2 years.

LEE W. DELHI, director and vice-president, California Steel Products Co.

• **Lee W. Delhi** has been appointed director and vice-president of the California Steel Products Co. of Richmond, Calif. Mr. Delhi is president of the American Welding Society and during the war was production chief for Western Pipe & Steel Co.

• **Joseph F. Molloy** has been made export sales manager of the Crompton & Knowles Loom Works, Worcester, Mass.

• **J. A. Thomas** has retired as president of the Liquid Carbonic Pacific Corp., Ltd. He has been employed in the Liquid Carbonic Corp., Chicago, and the Pacific Coast subsidiary organization for 33 years. **H. C. Mathey,** who has been dry ice sales manager in New York for the Liquid Carbonic Corp., has been made general manager of the Pacific corporation and moves to the West Coast to take up his new duties. **P. F. Lavedan,** president of the parent company, assumed the presidency of the Pacific company on Mr. Thomas' retirement. Mr. Thomas joined the Liquid organization in 1913 as a salesman in the Kansas area. **Lee W. Kinney** has been appointed distribution manager for the Liquid Carbonic Corp., Chicago, to succeed **Frank B. Andrews,** who recently was appointed production manager of Liquid's bottlers' machinery division.

• **Henry Rowold** has been appointed assistant general sales manager of Mack-International Motor Truck Corp., New York. Mr. Rowold, also a vice-president of the company, combines his new duties with those of national accounts manager, a position he has held for some time.

• **Raymond D. Critzer** has been appointed by the Leland-Gifford Co. as their sales engineer for the Cleveland district. **A. P. Witteman,** who has been in charge of this territory for the past 11 years will, on Apr. 1, open the Leland-Gifford Co.'s new Los Angeles office.

• **William C. Beddoe** has been appointed advertising and sales promotion manager of Divine Bros. Co., Utica, N. Y. Mr. Beddoe will be in charge of advertising, sales promotion and public relations for all divisions of Divine Bros. His previous experience includes 15 years as advertising and sales promotion manager of Congoleum Canada Ltd. and 2 years as promotion manager of James Lees & Sons Co.

• **Jack Bernstein** has been appointed manager of operations for California Air Products of Los Angeles, subsidiary of Burdett Oxygen Co., Cleveland. **William Young,** formerly manager of the Cleveland acetylene plant, will be in charge of the construction of the acetylene plant in Los Angeles. **Winfield Rice,** formerly of the oxygen industry in Portland, Ore., will be superintendent of the oxygen plant.

DONALD M. PATTISON, vice-president in charge of sales and member of board of directors, Warner & Swasey Co.

• **Donald M. Pattison,** general sales manager, Warner & Swasey Co., Cleveland, has been elected a member of the board of directors. He has also been made vice-president in charge of sales. Mr. Pattison gained his early industrial experience in the fields of engineering and sales, and in 1926 became vice-president, Wardwell Mfg. Co. He entered the Warner & Swasey organization in 1929 as a member of the sales staff, became manager of sales for the Cleveland district in 1936, assistant sales manager of the company in 1940 and general sales manager in 1942.

• **Gordon J. Wygant,** formerly sales engineer for Titeflex, Inc., Newark, N. J., has been named assistant sales manager. He joined the Titeflex organization in 1941.

• **Edward F. Dykstra** has been appointed advertising and sales promotion manager of D. A. Stuart Oil Co., Chicago. Mr. Dykstra was formerly connected with the Standard Safety Equipment Co.

• **Martin G. Levens** has been appointed Cleveland sales representative for the Columbia Chemical Div. of Pittsburgh Plate Glass Co., Pittsburgh. Since his release to inactive duty with the U. S. Naval Reserve last July, Mr. Levens has been associated with Columbia Chemical's sales department.

• **Dr. Frederick L. Matthews** has been appointed director of research of Monsanto Chemical Co.'s Merrimac Div. at Everett, Mass. **Harry W. Faust** will fill the former position held by Dr. Matthews of coordinator of petroleum activities in Monsanto's organic chemicals division. **Dr. J. F. Palmer,** a research chemist in the petroleum chemical research group, will take over Mr. Faust's former position as a group leader in the petroleum chemical research department. Dr. Matthews has been with the company since 1939 and Mr. Faust was first associated with Monsanto in 1929 as an analyst in the St. Louis research department. Dr. Palmer started with Monsanto in 1941 as a research chemist and after serving in the Army from 1942 until 1946, he returned to the St. Louis research department as a research chemist. **F. M. Eaton,** a former general counsel of the War Production Board, has been elected to the board of directors of the Monsanto Chemical Co.

...OBITUARY...

• **Dr. James A. Webb,** 75, founder and chairman of the board of the J. A. Webb Belting Co., Buffalo, died Mar. 14.

• **John A. Lund,** 71, former superintendent of rolling mills, Seneca Steel Wire Co., Fostoria, Ohio, for 12 years until his retirement in 1941, died recently. He was with the American Steel & Wire Co., Worcester, Mass., for 30 years before going to Ohio.

• **James F. McClung,** 70, retired superintendent of the Davis & Furber Machine Co., North Andover, Mass. foundry, died Mar. 13.

• **G. J. S. Thompson,** regional director in the Canadian region for U. S. Steel Export Co., New York, subsidiary of U. S. Steel Corp., died Mar. 14, following a heart attack. Mr. Thompson had been with U. S. Steel Export since 1911.

• **James Peckham, Jr.,** a vice-president of Wonham, Inc., New York, died recently. He had been with the company since 1909.

• **Arthur L. Whitney,** 70, president and general manager of the Whitney Screw Corp., Nashua, N. H., died Mar. 9. He was with the Reed & Prince Mfg. Co. before going to Nashua 24 years ago.

• **Fred T. Egan,** former vice-president of the J. A. Fay & Egan Co., Cincinnati, died recently.

• **Frederick C. Warhus,** 86, retired foundryman, died Mar. 11. He was with the Buffalo Cooperative Stove Co. for more than 50 years and at the time of his retirement was secretary-treasurer of the concern.

Industrial News Summary...

- **Scrap Prices Seen Leveling Off**
- **Twilight Steel Prices Softening**
- **Pig Iron Production Expanding**

INFLATIONARY tendencies in the steel market this week received a setback when, for the first time since the runaway scrap market began, scrap markets turned soft in some districts, declined slightly in others and were poised for a change at such points as Pittsburgh and Chicago.

Other developments in the current situation which may indicate a slow but orderly return to some sort of normalcy were a softening in so-called black market or twilight steel prices plus the attainment this week of a new and significant peacetime peak in steel production. Below the surface, supporting the apparent change in the steel scrap market as well as the high steel operating rate, has been a steady increase in the volume of pig iron production since the first of the year with indications pointing to a new high in pig iron output this month.

For the first time since last fall, when bitter competition between various scrap consumers broke out at points distant from the mills and had the effect of raising prices at those points, some major scrap users are out of the market early this week. This action has caused some anxiety in scrap circles and the first definite indication was a softening in scrap prices at Boston, a slight reduction in the average price in New York and a moderate downward trend at Philadelphia.

QUOTATIONS this week were steady at Pittsburgh, but there were indications that the wide spread there in the price of heavy melting steel might close up somewhat by next week because of weakness in the East. The average price at Pittsburgh has been definitely influenced by the price of scrap delivered to that district from the East.

The situation at Chicago, while reflecting no actual change this week, is in the same vulnerable position as the Pittsburgh market. The range at Cleveland on the other hand has been narrowed with a reduction in the top price for heavy melting steel. Whether or not this sudden weakness in the scrap market portends a sharp drop remains to be seen, but it is definite that the peak has been reached and the trend in scrap prices is downward.

Supporting this viewpoint is the fact that for several weeks higher prices have brought better shipments of scrap and in some cases large consumers have built up enough supplies to enable them to take a chance on staying out of the market as a protest against ridiculously high scrap prices. Furthermore, following the coal strike last December many blast furnaces which were down for repairs at that time are now in full production and the supply of steelmaking iron has been steadily increasing during the past 8 weeks. This has given many steel makers the advantage of increasing the amount of pig iron in the steelmaking charges.

THE IRON AGE scrap composite this week shows its first decline since the upward movement of scrap prices started last fall when it dropped from $39.67 a gross ton to $39.50 a ton, a decline of 17¢ a ton.

BROKERS and other purveyors of steel at more than so-called legitimate mill or warehouse price have become anxious during the past few weeks as to their ability quickly to dispose of steel in their hands or supplies over which they have control. This state of mind has been reflected in a substantial drop in so-called premium prices over the past few months. Some transactions which 2 months ago saw steel changing hands at 10¢ to 11¢ a lb are now being closed at prices close to established warehouse levels.

Furthermore, some holders of so-called premium steel are now willing to deliver the material to the user's plant and have added the incentive of allowing customer inspection of the material before payment is made. While this situation is not yet universal in deals of this kind, the trend is definitely in that direction and these so-called high premium markets may be a thing of the past within the next few months.

Manufacturers who in some cases have been receiving more steel than they needed and were either putting it in inventory or selling it at premium prices were this week considering outright cancellations of that portion not definitely needed for their own operations. These developments, in addition to others in the making, appear to be the vanguard of a slightly better condition in steel supplies. It may be some months however before such benefits will reach the majority of steel consumers.

In an effort to reduce steel backlogs further and step up the production of finished steel products, the steel industry this week raised its operating rate 1 point to 97.5 pct of rated capacity. A continuation of this level, expected by most steel officials, will greatly support the opinion that more and more manufacturers will get slightly better steel shipments in the second quarter.

SOME CONSUMERS, however, are bound to be disappointed in their second quarter shipments in view of the railroad carbuilding program which the steel industry will support to the extent of 10,000 freight cars a month. Customers whose quotas conflicted with steel company commitments to freight car builders have already been notified of the cuts that will be necessary in deliveries during April. During the latter month steel companies will supply enough steel for 7000 freight cars and will this week work out with Government officials the necessary details on the 10,000-car a month program.

The feeling throughout the steel trade this week continues to be one of caution and despite the heavy demand for steel products, industry officials are scanning the economic horizon for any signs which might indicate a change in the trend of steel buying.

• **BRITISH BACKLOGS ELIMINATED**—Due to the dislocation caused by the fuel shortage in Britain, the Iron & Steel Board has stepped in to cancel all backlogs for steel products other than sheets, tinplate, ternes, and blackplate. The order cancels all material on mill books for the third quarter and earlier, unless the material is in process by the end of March. The move is probably motivated by the desire of the government to get long-standing orders off the books, and reduce backlogs to an extent that priorities will operate more effectively. A similar move was taken in November of last year with respect to sheets, resulting in a general tightening of the priority picture of flat-rolled products.

• **WAA CUSTOMERS**—Industrial users rank second in the monetary volume of purchases of surplus property, it is indicated by a check of WAA sales for the period from November through February. During the 4-month period, wholesalers bought up $408 million worth, original cost, or 33 pct; manufacturers and other industrial users purchased $362 million or 29 pct; while veteran buying amounted to $266 million or 21 pct. Retailers were in fourth place with 8 pct, $97 million, and the Federal Government took 4 pct or $47 million.

• **SURPLUS BOLTS AND NUTS**—All surplus ferrous and nonferrous bolts, nuts, screws, rivets and related items, some $10 million worth, except aircraft types are scheduled for disposal by WAA by Apr. 30.

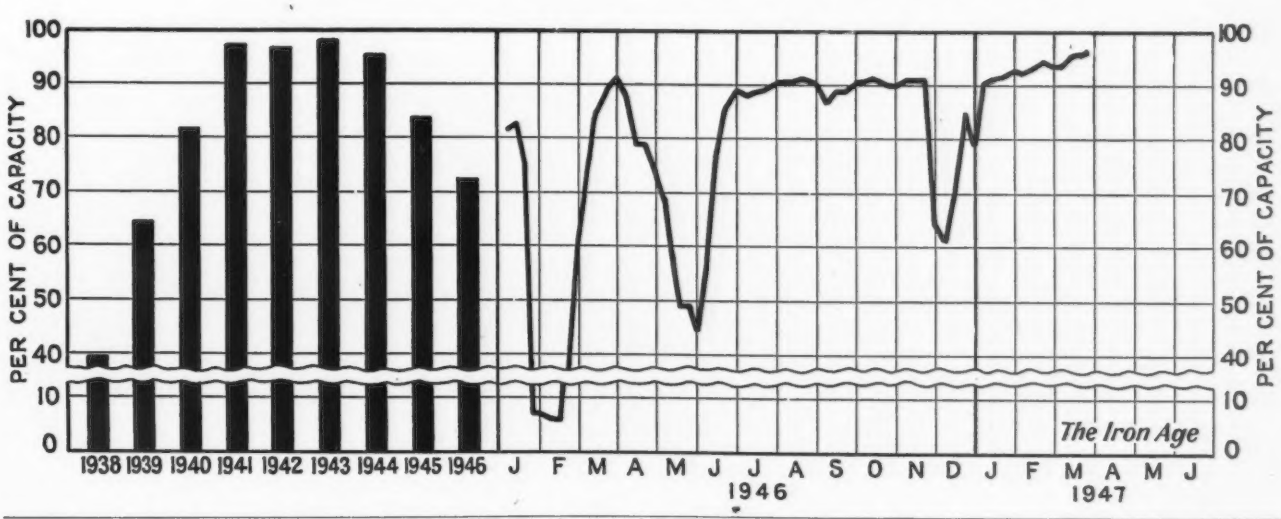
• **CANADIAN STEEL OUTPUT**—Production of steel ingots and castings in Canada in January amounted to 249,798 net tons or 82.7 pct of rated capacity and compares with 237,300 tons in December or 78.5 pct, and 244,623 tons in January 1946. Output for the month included 243,557 tons of steel ingots and 6241 tons of steel castings. Charges of steel furnaces in January included 129,978 tons of pig iron; 78,854 tons of home scrap and 61,488 tons of purchased scrap. At the end of January Canada's total steel furnace capacity was 3,623,400 net tons a year of which 2,785,400 tons were basic open hearth; 573,200 tons electric and 264,800 tons steel castings.

• **STEEL PAYROLLS HIT PEAK**—The January payroll for wage earners and salaried workers in the iron and steel industry established a record at $155,778,000, which exceeded even the wartime monthly high mark of $154,976,700 paid in March 1945, according to the American Iron & Steel Institute. December 1946, payroll was $137,216,500. During January, average hourly earnings of the industry's hourly, piecework and tonnage workers was 137.4¢ per hr, a record, compared with the full-year average hourly rate of 134.7¢ received during 1946. The wage earners worked an average of 40.4 hr per week during January, compared with 35.7 hr in December 1946. Total January employment averaged 601,200, of which 512,600 were wage earners and 88,600 were salaried workers.

• **FABRICATED STEEL ORDERS**—The estimated total bookings of fabricated structural steel for the month of February 1947, according to the American Institute of Steel Construction, Inc. amounted to 124,436 tons, some 22,000 tons larger than the bookings for the previous month. The estimated total for January and February was 226,305 tons, or an increase of 11 pct over the average of 203,858 tons booked in the same months in the averaged 5 prewar years 1936-1940. February shipments totaled 123,148 tons, a slight decrease from January, but some 39 pct greater than the averaged February shipments in the 5 prewar years. The tonnage available for fabrication at Feb. 28 amounted to 655,776 tons.

• **FREIGHT CAR PROGRAM**—The government-sponsored freight car program is expected to result in the production of 4000 cars in March, 5800 in April, 7100 in May, 9800 in June, 10,000 in July and 9000 in August, according to ODT. The announcement was made after a 2-day meeting attended by representatives of the railroads, car builders, car lines and component and specialty manufacturers. ODT said that production schedules after August would have to be revised and would depend on the availability of materials and the number of cars then on order. ODT also said that orders for new freight cars were expected to increase from 86,031 on Mar. 1 to 125,000 on Apr. 1. Conferees agreed that the shortage of pig iron may upset the above production forecasts.

Steel Ingot Production by Districts and Per Cent of Capacity



Week of	Pittsburgh	Chicago	Youngstown	Philadelphia	Cleveland	Buffalo	Wheeling	South	Detroit	West	Ohio River	St. Louis	East	Aggregate
March 18.....	100.0	94.5	91.0	90.0	97.5*	104.0	100.0	99.0	102.5	106.0	96.5	76.5	105.0	96.5
March 25.....	102.5	96.5	91.0	90.0	100.5	104.0	100.0	99.0	102.5	105.0	96.5	73.0	106.0	97.5

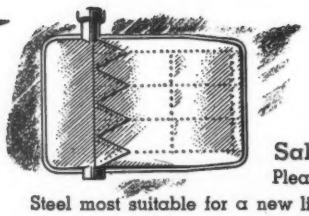
* Revised.

Are your Corrosion Problems

like any of these?

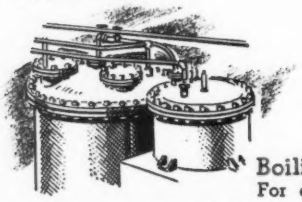
Everyone knows that Stainless is ideal for handling nitric acid—but what about corrosion from these other chemicals? Eastern's Technical Staff answer questions like these every day. Sometimes the answer can be found only with test sheets; more often the experience for which Eastern technical men have gained their esteem provides a rapid, accurate solution to the problem. And much basic, useful information on the corrosion resistance of all types of Stainless Steel is in the new complete catalog "Eastern Stainless Steel Sheets." Write for your copy. JMLco E-FF1

"Ask EASTERN for the Answer when STAINLESS is the Question"

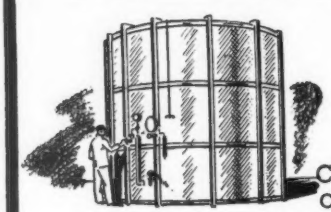


Salt Water?
Please suggest the type of Stainless Steel most suitable for a new line of highest-quality marine trim, including rudders and stabilizer fins.

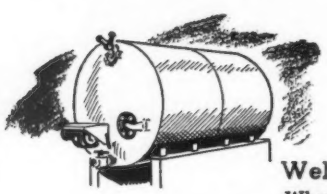
Fruit Juices?
Will E-S 18-8 Stainless (Type 302) canning reservoirs be all right for handling citrous fruit juices including lemon juice?



Boiling Peroxide?
For a new oxidation process using boiling concentrated hydrogen peroxide, would low-carbon E-S 18-8 stainless (Type 304) containers be resistant?



Chloride Storage?
Our processing involves storing cold alkali-metal chloride solutions (aqueous) in E-S 18-8 stainless tanks. How can we inhibit pitting at the liquid line?



Welded Vessels?
What type of Stainless would you recommend for large all-welded autoclaves to handle reactions of maleic anhydride in making synthetic resins?

ES

EASTERN STAINLESS STEEL CORPORATION
BALTIMORE 3, MARYLAND

Fabricators Resent Basic Steel Influence in Labor Contracts

Call Standard Contract Unfair; Would Prefer Individual Pacts With USWA

o o o

By THOMAS E. LLOYD
Pittsburgh Regional Editor

o o o

Pittsburgh

• • • **Despite allegations** that every manufacturer has a voice in negotiating his CIO labor contract, a survey of western Pennsylvania plants produces an almost unanimous opinion to the contrary. Plants covered were steel fabricators, processors and allied manufacturers, outside of the basic steel producers. Further, all those questioned felt that the small manufacturer was not getting a square deal on the contract, simply because basic steel's contract had to be accepted.

Considerable attention has been focussed from time to time on the question of whether or not steel fabricators, processors, and allied manufacturers justifiably follow the wage and working conditions pattern developed by basic steel with the United Steel Workers of America (CIO). While the public has been belabored with this discussion by various trade or manufacturing groups or associations, very little has come directly from the manufacturers themselves.

In order to determine exactly the attitudes of the manufacturers with regard to labor contracts based on those negotiated by U. S. Steel Corp., and other steel producers, a group of western Pennsylvania fabricators that represented a cross section of manufacturing types were queried as to reactions to the big steel contract. All of these companies have USWA unions in their plants and all of the present contracts are based on the agreements made last year.

The types of manufacturers represented in the investigation include makers of foundry machinery, mill machinery, mine cars, tubes, heavy structural fabrication, gears, roofing products, barrels and other cooperage, high temperature castings, forgings, rolls, porcelain enameled products, sheet metal products, general machinery, plate and structural fabricators, as well as steel warehousing operations. Thus, no particular type of plant or process weighted or influenced unduly the investigation.

These manufacturers, generally, feel that they should be able to negotiate a contract with the USWA individually, presenting their individual problems and at least having them recognized. Up to now, the pattern for the contract is pretty well established before the smaller plant operator has a chance to see it and the result is that he accepts it or his plant is on strike.

Aside from the wage issue itself, small manufacturers feel that special hardship is worked on them by the basic steel contract by forcing them to accept steel's seniority and grievance procedures, shift differentials, retroactivity features, and many fringe issues. There is a feeling that the small companies need an entirely different set of rules or an entirely different type of contract than that negotiated by the steel industry.

As to whether the small manufacturer should or should not meet the wage pattern of big steel, the feelings are somewhat mixed. Some feel that the wage pattern should be met, but the majority believe that small companies should have a lower basic wage pattern. With a lower basic wage pattern, the majority of manufacturers do not feel they would lose any appreciable number of work-

Hey, Fellows!!

ers to the steel industry with its higher rates of pay. One manufacturer felt that the work in his plant was not comparable to steel industry job classifications, so that his loss would be negligible. Another claimed that employee relations were good, but the CIO local managed to keep them "steamed up" and always on edge. Better working conditions, less occupational hazards, geography of the plant, attractive incentive rates, better advancement opportunities, and similar incentives were offered as methods by which the manufacturers could hold their men. Some feel that there would be a drifting away of labor, but it couldn't be helped.

In an expression of whether or not collectively the small manufacturers could force the USWA into considering a separate contract, the weight of opinion was that a separate contract could be reached by collective action. However, some manufacturers feel this was possible only if the government is not also a party to setting the pattern and the bargaining. There are those manufacturers who want no part of a "small manufacturing industry" contract, but wish to deal directly with their men. Obviously, however, with a USWA plant this is impossible, because the contract negotiations will never be left completely up to plant personnel even though such personnel are local union agents.

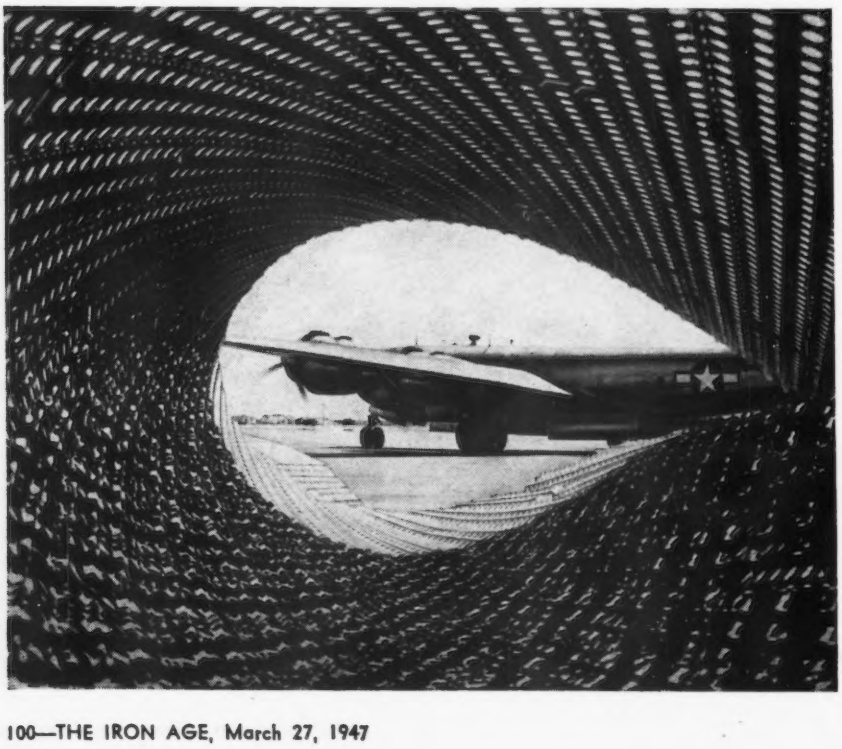
One manufacturer, Birger Engstrom, general manager of McDowell Mfg. Co., Pittsburgh, recently told the House Labor Committee in Washington that hundreds of steel fabricating companies could have labor peace if they were permitted to negotiate with the USWA, but instead they are barred from negotiations and must accept the terms made with the large steel companies. While his company had no strikes during the 43 years of its existence prior to being unionized in 1942, the employees were forced off the job by the general steel strike in 1946 and a 7-week shutdown resulted.

Many of the companies queried declined to comment on the USWA contract now under negotiation because many of them actually have not yet been consulted. Several Pittsburgh executives stated that the steel union made its demands, that the company has made counter demands and offers, but the demands of both the union and the company have been rejected. One manufacturer indicated that a wage demand of 29¢ an hr has been made by the USWA to compensate for the increase in cost of living.

There is a general feeling among small plants that they do not have collective bargaining and cannot reach their own men. Present laws and Supreme Court interpretations of these laws leave the union with dictatorial powers. One producer stated that collective bargaining under the present laws is a swindle.

Pittsburgh manufacturers are too much "under the shadow" of the steel industry and the steel industry is the dominating factor in wages, the survey shows. The small plant operator loses his identity. The complexities of the steel contract are passed along to the fabricators, who, it is felt, could work with a much simpler agreement. This might necessitate bargaining on a plant level, but this, the manufacturers feel, is quite desirable.

REAP THE WIND: *This is what happened to the steel landing mat at Hickam Field, Hawaii, as the P-82 twin-Mustang "Betty-Joe" took off on a test hop prior to its record breaking flight to New York. Seen through the rolled up steel matting is the B-29 "Pacusan Dreamboat,' the "Betty Joe's" escort on its flight to Honolulu.*



Forms Merger Unit To Keep Closer Watch On Mergers of Industry

Washington

• • • **Formation of a** Merger Unit in the Anti-Trust Div. of the Dept. of Justice for the purpose of keeping a closer watch on industry mergers to see that anti-trust laws are not violated in such actions has been announced by Attorney General Tom Clark.

"This action is made necessary by the tremendous increase in the number of business mergers," Mr. Clark said. "It is designed to forestall the creation of a vast number of monopolies and combinations in restraint of trade by the merger device . . . If this trend is unchecked, the small business of America may disappear from the area of effective competition."

Edward P. Hodges will head the new unit with Victor H. Kramer as his assistant. The work of the unit will be under the general supervision of the Complaints and Small Business section.

It will operate in three major ways. In addition to continuing review and examination of all corporate mergers, it will also furnish opinions in advance whether proposed mergers are

likely to be considered violations, and it will prosecute merging companies for what the Department believes are violations of the Clayton or Sherman Acts.

Admitting that only a relatively few, perhaps a half dozen out of 150 or more recent mergers have been thought violations, the Department's officials are gravely concerned over reports that large numbers of independent, competitive businesses in the mining and manufacturing industries have disappeared as a result of mergers. Mergers or concentrations in the metals industries, machinery and transportation equipment fields, it was said, have been particularly noticeable.

A number of large corporations have made numerous acquisitions over the past few years, it was said, including nine acquisitions each by U. S. Steel, Bethlehem Steel, Jones & Laughlin, and Barium Steel.

Officials said that mergers in 1946 were more than twice the average in the immediate prewar years and considerably above 1945. While many mergers do not violate the anti-trust laws, it was said, in some cases they provide "a classic means" of disposing of competitors.

Awarded Steel Contract

Washington

• • • **A contract for** the fabrication and erection of the structural steel for the proposed Veterans Administration hospital at Albany, N. Y., has been awarded the Harris Steel Construction Co. of New York City, according to the Army Corps of Engineers. The low bid of $920,229 had already been announced.

At the same time, the Engineers announced that the necessary steel for the H-piling would be provided jointly by the Bethlehem Steel Co. and Carnegie-Illinois. The bids submitted by the two firms were identical, each bidding $205,252, and the contract was divided between them.

Big Bailey Bridge Buyer

Washington

• • • **WAA's best** customer to date has been the government of Siam, which purchased 46 Bailey spans originally valued at more than a million dollars.

A-L Foremen Say No

Pittsburgh

• • • In what is believed to be the first such action in the steel industry, supervisory employees of Allegheny Ludlum Steel Corp.'s, Watervliet, N. Y., plant have come out formally and flatly against unionization in the face of the recent U. S. Supreme Court ruling that they have a right to organize.

H. G. Batcheller, president of Allegheny Ludlum, on Mar. 20, received the following resolution from the Watervliet plant:

"In view of the recent Supreme Court decision in the Packard case, we, the managers, department managers, assistant managers, superintendents, assistant superintendents, and foremen, constituting the management of the Watervliet plant, confirm our belief that the unionization of management is not consistent with the best interests of the corporation."

The resolution was signed by the entire supervisory force, including shop foremen who are paid hourly wages. None of the signers is at present a member of any union.

Truman Asks Congress To Extend Control On Basic Material Export

Washington

• • • **President Truman** has asked Congress to extend government control over exports of steel and other basic materials and commodities for one year past their present expiration date of June 30.

Such controls are presently exercised over approximately 500 industrial, agricultural and other products, representing a reduction of about 2500 from the wartime peak of about 3000 items.

In a special message, the President told Congress that extension of controls is necessary not only as a hedge against increased prices and cost of living in this country but to enable the United States to carry out its foreign policy and its "international responsibilities."

Pointing out that foreign demands are extremely large and that prices in most cases are above our own, he declared that uncontrolled exports would not only increase domestic shortages but inevitably living costs as well.

"Our steel, lumber, building materials, and many other basic industrial commodities are sought throughout the world," the message stated. "Shortages of many of these commodities restrict our own production of other essential products. Unrestrained export would inevitably limit the level of our own domestic production and employment.

"Furthermore, there are instances in which we wish to direct exports to those countries which produce commodities essential to our own economy. Thus, limited amounts of equipment have been directed to certain countries in order to increase the production of tin, hard fibers, etc."

Quick action on the extension was requested in order that industry and business might know just where they stand and make their plans accordingly.

Asks Continuance Of Guaranteed Wage Study

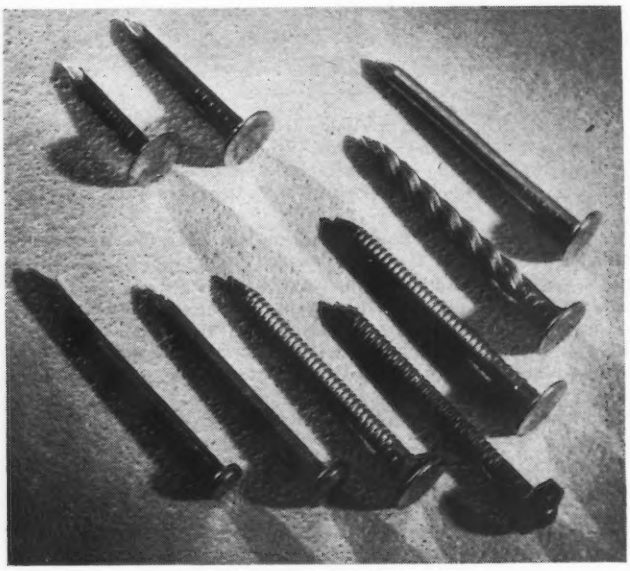
Washington

• • • **Sen. Brien McMahon** (D-Conn) has introduced a bill (S-889) which would provide for continuance on a permanent basis the government's study and analysis of guaranteed annual wage plans, such as that just completed by Murray W. Latimer.

Senator McMahon's proposal would place the study under the joint direction of the Secretaries of Commerce and Labor who would maintain an up-to-date file of all such plans and agreements; this would be made available to either employees or employer interested in working out such proposals.

Furthermore, the two departments would be directed to furnish "appropriate" assistance to interested persons in formulation of such plans or to states desiring to draft legislation pertaining to guaranteed wages.

This follows substantially a recent recommendation of the White House (THE IRON AGE, Mar. 13, p. 99 which requested a still broader study of the economic effects of the guaranteed work or wages.



ALUMINUM NAILS: *Here are several types of aluminum roofing nails now in use, as well as a common 8-penny nail (at extreme left). Spiral and ringed shanks are to improve holding power. The fourth nail from the right has a lead head, the fifth has a neoprene washer to seal the nail hole, and the sixth has an umbrella type head.*

Aluminum Nail Seen New Factor In Special Purpose Field

Present Makers Now Include Nine Old Line Firms With Others Also Interested

o o o

By T. E. LLOYD
Pittsburgh Regional Editor

o o o

Pittsburgh

• • • **"For the want** of a nail" a lot of houses were lost since the war when the scarcity of materials, including nails, held up construction. The common nail has had a face lifting, and a new type is being placed on the market that may establish itself as a worthy competitor to special purpose and stainless and nonferrous nails.

Starting back some years ago, it became evident to Aluminum Co. of America that for use with aluminum sheet roofing and siding aluminum nails were necessary. Rusting of wire or galvanized nails occurred long before the sheet needed repair, and repair was always required of the fastening device. The aluminum alloys used at that time were 17S and 24S, which required heat treatment of the nail itself after heading and forming. This was a difficult problem since nail manufacturers were not equipped for such an operation, and it was soon realized that a heat treated wire that could be formed into nails was required.

By the fall of 1945, after the end of the war, aluminum roofing, both flat and corrugated, became a real factor in the roofing market, especially in the south and southwest. Both Alcoa and Reynolds Metals Co. have been the primary factors in the production of these products.

Alcoa, continuing its early investigations, developed a special aluminum wire from the alloy 61S-T81, a standard specification that is cold worked between solution heat treatment and artificial aging. The wire has a tensile strength of about 55,000 psi and a yield strength of 51,000 psi, whereas straight 61S-T has a tensile strength of about 45,000 psi and a yield of 40,000 psi. This alloy, according to Aluminum Co. of America experiments, provides the best corrosion resistance and can be heat treated in wire form, yet easily formed in nail making machines without head cracking of the nail itself.

The development of an alloy that permitted the cold heading and forming of nails from wire after heat treating the wire opened the way for the old line nail manufacturers to participate in this new business. To date, nine of them are making aluminum nails and several other manufacturers are contemplating aluminum nail production.

The present manufacturers include: Dickson Weatherproof Nail Co., Evanston, Ill.; Nichols Wire & Steel Co., Davenport, Iowa; Pittsburgh Steel Co., Pittsburgh; Clendenin Bros., Baltimore; Angell Nail & Chaplet Co., Cleveland; Wickwire Bros., Cortland, N. Y.; Independent Nail & Packing Co., Bridgewater, Mass.; Atlas Tack Co., Fair Haven, Mass.; John Hassell, Inc., Brooklyn; Newell Mfg. Co., Ogdensburg, N. Y.

The bulk of these producers buy drawn wire, from which nails are made directly. However, several of them purchase redrawing rods, which they draw down to wire sizes, heat treat either in their own shops or have it done in Alcoa plants or heat treating commercial shops, and then form into nails. The principal wire drawers, which process rods, are Driscoll Wire Co., Shelton, Conn.; Nichols Wire & Steel Co., Davenport, Iowa, and Aluminum Co. of America.

Aluminum Co. of America does not anticipate getting into the general nail market. The special nail market is believed to be the main outlet for aluminum nails, especially where aluminum is used as the base metal to be fastened. These applications include, among others, aluminum roofing and siding, aluminum shingles (a relatively new product on the market), aluminum gutters and downspouts, aluminum flashing, etc. Also, it is felt that aluminum nails can be effectively utilized in applying other types of patented materials such as asbestos and rubber base roofing and siding products.

The wire drawing capacity for aluminum presents no particular problem. Heat treating capacity, while sufficient at present, may

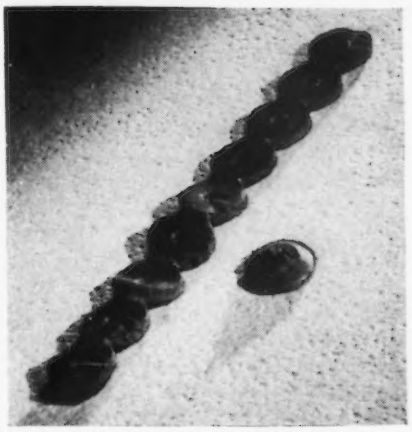
present a bottleneck in the future. It is difficult now to determine the capacity of the aluminum nail industry, since the amount of rods allocated to nails will depend upon nail and other end use demands; and the actual nail producing capacity is dependent entirely upon how much of the normal nail making capacity will be devoted to aluminum nails and how much of the wire heat treating capacity can be devoted to nail wire. If demand warrants, probably 5 million lb of aluminum nails a month can be produced; equivalent in number to about 15 million lb a month of steel or nonferrous nails.

The roofing nail is the first and primary nail developed. These vary in size, but the standard developed is a 1¾ in. nail with a ⅜ in. head and shank 0.135-in. in diam. This same nail has been made with a shank 0.145 in. in diam. Practically all of the manufacturers have made this type nail, and many have experimented with the ring shank to increase the holding power of the nail. Independent Nail & Packing Co. has been producing the roofing nail with a screw shank, and Pittsburgh Steel Co. produces the nail with the umbrella type head. Dickson makes the nail with the lead head. Samples of these roofing nails can be seen in the accompanying illustration.

In addition to roofing nails, the common nails, gutterspikes, slating nails, siding and single nails, tacks, and other special types have been manufactured. Many of these are now undergoing tests.

Holding power of a nail is a problem with all types of nails. The ring and screw shanked nails are methods designed to increase the holding power. Alcoa has experimented quite successfully with giving the nail a patented Alrok treatment. This chemical dip changes the characteristics of the shank surface of the nail, and in doing so increases the holding power between 200 and 300 pct. There are various surface treatments that can be used for aluminum nails, but the Alrok treatment has been found the best.

In the use of roofing nails, a seal between the nail and the aluminum roofing sheets is desirable, whether the nail is aluminum, ordinary wire or galvanized wire. Two methods of sealing have been developed. One employs a strip of



ROOFING SEALS: *To guard against seepage through metal roofs, these washers have been designed for use with aluminum nails. The strip, a mastic material, is applied by hand when the roof is installed. The ring washer is neoprene and can be applied either by hand or mechanically. A machine has been developed to place the washers on the nails and the nails are purchased ready for use.*

mastic washers that are soft and somewhat resilient. These are applied by the workman that installs the sheet. This, of course, is the main obection to this type washer, since it is too easy for the workman to discard the washers entirely.

Another method is a neoprene washer. Up to now this washer has been applied by hand to the nails, a slow and costly operation. However, the Gora-Lee Corp., of Stratford, Conn., has developed a machine that will place the washers in position on the nail. While the development of the machine itself is probably not too difficult, there is always the question as to whether or not the market warrants the investment in such equipment. The washers used are shown in an accompanying photograph.

Manufacturers of aluminum nails feel that the product has definite advantages in the special nail market. The price at present offers a good profit margin. While aluminum nails generally cost about 12 times more per lb than steel nails, there are about three times as many nails per unit weight, bringing the nail for nail price ratio to about 3:1 in favor of steel nails. However, compared with stainless and other nonferrous type nails, the price is appreciably lower.

Of course, in the application of aluminum base materials, the aluminum nail offers specific advantages. The common and the galvanized nail inevitably rusts out before the aluminum. Another advantage is the fact that the products of aluminum oxidation will not discolor or stain. This is especially advantageous in wood siding, etc., where painting is frequently necessary to cover the stain and rust spots under the nails.

Anticipates Agreement Between Operators And UMW Before June 30

Pittsburgh

• • • **Adm. Ben Moreell,** the new president and chairman of the board of Jones & Laughlin Steel Corp., and recently coal mine administrator for the government, stated that he anticipated an agreement between the mine operators and the AFL-United Mine Workers before June 30, when the mines revert back to the operators. He stated that indications were that there seems to be a much better opportunity for labor peace in the coal mines than ever before, because both the union and operators are coming to realize the importance from both economic and humanitarian viewpoints.

He also stated that he believed if there is a modest increase in steel wages, there should be no increase in steel prices, but eventually he expected a decrease in steel prices. This, he pointed out, was a possibility as the market becomes more stable, processes improve and facilities are expanded. He declined to comment on present wage negotiations because they are not far enough underway to make any specific statements.

Adm. Moreell indicated no definite plans had been made by J&L for expansion in other territories. However, because of the conditions, caused by certain economic factors such as the restricting freight tariffs, there is an excellent chance that J&L may have to obtain capacity in other geographical areas in order to be competitive in those areas. He emphatically pointed out that expansion in other areas will not be at the expense of the facilities in the Pittsburgh district.

Start Program to Make Gasoline and Gas Fuel From Bituminous Coal

Pittsburgh

• • • **A research and** development program announced by Pittsburgh Consolidation Coal Co., in collaboration with Standard Oil Co. of New Jersey, will be aimed at perfecting commerical processes for making gasoline and a gas fuel of high heat value from bituminous coal. What may lead to a new multi-million dollar fuel industry may necessitate commercial gasification and liquification plants costing as much as $120 million per unit.

With preliminary analysis and laboratory studies completed, Pittsburgh Consolidation Coal Co. plans to construct a pilot plant. Following a year or more of experimental operation of the small-scale plant will come the preparation of plans for financing the large commercial development. Standard Oil Development Co., the Central technical organization of Standard Oil of New Jersey, has extensive background of resarch on this and related subjects. Hydrocarbon Research, Inc., which is also engaged in research on gasification and liquification of coal, will participate in the work.

The new pilot plant will be built at Library, Pa., at a cost of about $300,000. It will consume about 50 tons of coal a day and from this will come a daily production of about 2,400,000 cu ft of gas suitable for synthesis into liquid and gas fuels.

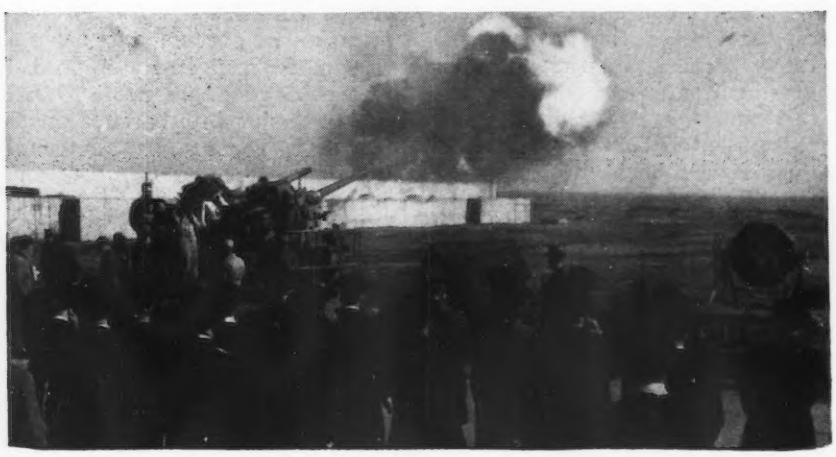
A commercial plant for making liquid fuels and a high Btu gas would likely be located within 25 miles of Pittsburgh, adjacent to one of the company's huge coal tracts. It is hoped that the commerical plant will be ready for operation by 1950 or 1951. One single plant of the size being considered could yield a gas of high heat value in quantities equal to the output of the Big and Little Inch pipe lines and create a local source of gasoline, diesel and other fuel oils, and a certain amount of alcohols. Such a plant would utilize about 20,000 tons of coal a day.

A unique advantage of the projected conversion process is that it has a flexible pattern of production. It could be arranged to produce 400 million cu ft of gas per day in the winter months and reduce this quantity by 50 pct. during the summer months when the plant would be set up to produce larger quantities of gasoline.

The process, according to Joseph Pursglove, Jr., vice-president in charge of research and development, consists of two basic steps. The coal must first be gasified; i. e., made into carbon monoxide and hydrogen. This produces synthesis or feed gas, similar to water gas. The feed gas is put into a hydrocarbon synthesis plant that will produce a certain proportion of liquid fuels and a certain amount of gas.

Operation of a commercial plant large enough to produce 400 million cu ft of gas per day would require the output of at least three large mines, and use more than 6 million tons of coal a year. Coal quality is not an important factor, since run of mine coal can be used as it comes from the ground, eliminating expensive cleaning and screening costs. The high volatile coals of the Pittsburgh region should be quite satisfactory.

WHAT NEXT? *At the start of the war the Navy had nothing to speak of in the way of automatic antiaircraft guns. Then came the 20 mm, and finally the 40 mm gun. Now the Navy reveals it has an automatic 3-in. 50 cal twin mount antiaircraft gun, which this group of observers is watching during test firing at the Naval Proving Ground, Dahlgren, Va.*



U. S. Steel Sales Hit Peak in 1946; Weekly Wages Dip Slightly

New York

• • • **Sales income of** $1,496.1 million in 1946 set a peacetime peak record for U. S. Steel Corp., but profits per dollar of sales were the lowest for any peacetime year of comparable steel shipments. This was a highlight of the corporation's annual report, released Mar. 26. The report also reveals that for the last 6 months of 1946 average weekly earnings of its employees were slightly less than average weekly earnings during 1945 and average hours were 10 pct less.

U. S. Steel produced 21.3 million tons of ingots and castings in 1946. Income was $88.6 million which includes $26.2 million transferred to income from a special reserve, primarily to cover strike losses. The statement shows that after declaring the usual $7 preferred and $4 common stock dividends there was left for reinvestment in the business $28.6 million, an amount the corporation holds is insufficient based on past experience.

Spotlighting the "prince or pauper" nature of the steel business is a portion of the report which contrasts profits in good years and bad, in peace and in war. Last year's profit per dollar of sales was 6¢; in the 5 war years (1941-1945) it was 4¢. In 5 good years (1920, 1923, 1926, 1928. 1940) it averaged 10¢, and in 5 poor years (1921, 1931-1934) there was a loss of 6¢ on every dollar of sales. In the 22 peace years 1919-1940 the average profit was 5¢.

Actual expenditures for additions to and improvement in facilities during 1946 amounted to $210 million, including properties purchased from the government, the report states. At the end of 1946 some $277.5 million remained to be spent on improvements.

Mechanization In the World's Largest Coal Mine

COMBINATION belt lines, right, feeding the blending bins typify the extent of mechanization at U. S. Steel's Robena coal mine. Coal with higher sulfur and ash content is blended with coal having less of these ingredients to insure the chemical uniformity required for producing metallurgical coke.

CONVEYOR carries coal out of the mine at the rate of 50 tons per min. Operated by the corporation's coal producing subsidiary, the H. C. Frick Coke Co., the Robena mine is scheduled eventually to ship 20,000 tons of coal a day. Development work on the mine was begun in 1937.

CRUSHED coal cascading at the rate of 150 tons per min. loads river barges through the seven chutes shown below at the tipple of the Robena mine, located 80 miles south of Pittsburgh on the Monongahela River. From here it goes to Carnegie-Illinois' Clairton byproduct coke ovens.

Committee Allocates U. S. Additional 5686 Tons of Tin

Washington

• • • **An additional** 5686 tons out of the 6785 tons of world tin now available for distribution has been allocated the United States for the first half of 1947 by the Combined Tin Committee.

This represents a substantially smaller amount than had been tentatively promised by the Committee in making the January interim allocations, at which time this country was allotted 3640 tons. Final review and probable allotments for the first 6 months of 1947 will be made in May.

In explanation of the smaller allocations, the Committee said the world demand for the first half approximates 60,000 long tons against probable new supplies for the same period of 17,700 tons.

While the Committee would not predict how soon the supply situation might improve, it said that by May there might be a further small quantity available from remaining Japanese stocks of about 4000 tons which are now being sampled and sorted.

Relatively large allocations in 1946 were made possible through acquisition of metal found in Malaya, the Netherlands Indies and Japan at the end of the war. Although cognizant that such windfalls would not recur, the Committee did not anticipate a number of factors which have entered the picture since the first of the year. As a result, the present outlook is about as follows:

Exports from the Dutch Indies have been retarded by the unsettled shipping conditions and smelting operations have been seriously slowed down as a result of coal shortages. New equipment is being obtained, however, and it is hoped that the fuel shortage is of a temporary nature. Belgian production is reported as on the increase.

Economic and transportation problems combine to reduce Chinese tin production far below prewar levels while exchange problems have made it difficult to obtain even the tin from Siam which had been allotted during 1946. Fuel shortages and slowness of rehabilitation have also handicapped recovery of the Malayan mining industry.

Extra Quota For First Half Is Considerably Smaller Than Committee Promised

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COMBINED TIN COMMITTEE INTERIM ALLOCATIONS

(For First Half 1947, in Tons)

Country	Jan 21	Mar. 10	Total
United States ...	3,640	5,686	9,326
France	2,275	149	2,424
India	1,140	....	1,140
Canada	680	360	1,040
Italy	455	485	940
Sweden	390	10	400
Switzerland	365	....	365
Czechoslovakia ..	340	8	348
Poland	205	20	225
Denmark	140	20	160
Hong Kong	150	....	150
New Zealand ...	150	....	150
Misc. Europe ...	490	33	523
Misc. Middle East	200	14	214
Latin and South America	295	....	295
	10,915	6,785	17,700

Included in the miscellaneous categories above are the following total allocation figures to date: Brazil, 115; Austria, 115; Turkey, 110; Argentina, 100; Egypt, 100; Yugoslavia, 90; Finland, 76; Norway, 72; and Greece, 60.

Of the almost 10,000 tons of tin found in Japan at the end of the war, the Committee allotted 5000 tons in 1946 leaving about 1000 tons available during the first half of 1947; the remainder is being sampled and sorted for reporting and allotment.

A number of nations including India, Switzerland, Brazil, Argentina, Austria and Yugoslavia were not recommended for additional allocations this month. As the Committee explained in January, the quantities then made available were based arbitrarily on the allocations for the second half of 1946 and intended primarily to keep stocks moving.

In view of the tightening supply, the **March interim recommendations** are designed to bring the relative positions of the claimant countries more into line as to equitable distribution. Review of needs and allotments in light of the present supply indicate to the Committee that some countries have already received a fair allotment for the first half.

Malaya and Hong Kong are not sources of supply for the March interim allocations since requests already received are expected to completely absorb all quantities available through June 30, it is emphasized.

However, supplies may be obtained from the Netherlands, Dutch Indies, Belgium and the Belgian Congo, and China. Applications for Japanese tin must be received before May 1, the Committee said.

Awarded Research Medal

New York

• • • **Dr. Charles A.** Thomas, vice-president and technical director of Monsanto Chemical Co., has been awarded the 1947 Industrial Research Institute Medal, presented for outstanding contributions to the field of industrial research.

Dr. Thomas was one of the key figures in the development of atomic energy and was one of a group of scientists to receive the medal of merit from Secretary of War Robert P. Patterson in March 1946.

The new medal will be presented to Dr. Thomas June 5 during the annual meeting of the institute at Swampscott, Mass. Previous recipient of the award, which was established last year, was Dr. Willis R. Whitney, organizer of the General Electric Research Laboratory.

Reports 1946 Profit Up

Chicago

• • • **Stewart-Warner Corp.** had net sales of $58,895,257 in 1946, and net profit of $2,095,187, equal to $1.65 per share of $5 par value common stock outstanding for the 12 months ended Dec. 31, 1946.

In 1945, net sales and revenues totaled $78,430,384, with net profit of $1,634,200, equal to $1.28 per share. Dividends of $1 per share were paid in 1945 and 1946 on the 1,272,920 shares of common stock.

Weekly Gallup Polls . . .

People Divided on Plan of Succession to Presidency

Princeton, N. J.

• • • **With the death** of Franklin D. Roosevelt and the accession of Harry S. Truman to the Presidency, the order of succession beyond the vice-president has become a question of pressing importance, according to George Gallup, director, American Institute of Public Opinion.

President Truman himself has recommended that a change be made in the order of succession, and hearings on the question are going forward in Congress at the present time.

The way things now stand, should the president and the vice-president die while in office, the Secretary of State—at present George C. Marshall—would become the President.

This line of succession was provided by Congressional law. The Constitution itself makes no provision for succession beyond the vice-presidency, declaring that Congress shall make such provision.

President Truman's recommendation is that some other plan of succession be devised "so that the office of the President would be filled by an officer who holds his position as a result of the expression of the will of the voters in this country."

Specifically, the Truman recommendation would make the Speaker of the House next in line after the vice-president. In the event there should be no Speaker of the House, or if he failed to qualify at the time a vacancy occurred in the Presidency, Mr. Truman recommended that the President pro tempore of the Senate act as the Chief Executive until a duly qualified Speaker was elected by the House.

The public has not thought long and hard on this problem, even though President Truman recommended the change right after he assumed the office of President, and the proposal was publicized by the passage in the House of a bill carrying out its provisions.

In fact, as of this time, fewer than half the voters know the structure of their government well enough to say who would become President if anything should befall Truman.

And among the voters who can say who will become President if anything happens to Truman, opinion is closely divided on whether things should remain as they are, or should follow the Truman proposal.

The institute polled sentiment throughout the nation by asking those who could be considered "informed" (could tell who would succeed President Truman if anything were to happen to him during his present term) this question:

"President Truman has suggested that the Speaker of the House of Representatives instead of the Secretary of State should become President if the President and Vice-President both die. Would you favor or oppose this change?"

The results among the informed group:

	Pct.
Favor Speaker of House	41
Favor Secretary of State	44
Undecided	15

One of the peculiarities of the present situation is that the Speaker of the House, Joseph W. Martin, Jr., is a Republican. When President Truman first recommended the change in succession, the Speaker of the House was a Democrat.

However, the President recently reiterated his recommendation, restating the principle upon which he based his recommendation—that the man be in office by expression of the voters.

Voters in Mr. Truman's own party do not support the proposal he puts forth. Republican voters are evenly split on the question.

This is shown in the following:

	Dem. Pct.	Rep. Pct.
Favor Speaker of House	38	44
Favor Secretary of State	46	43
No Opinion	16	13

Despite the fact that older people are supposed to resist any proposals for change in the established order, it is the older people in the present poll who throw more of their weight behind the Truman proposal, than is the case with the younger voters.

Voters Think Man and Wife Should Be Allowed to Split Income to Save on Taxes

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• • • **With the thoughts** of millions of taxpayers recently centered on income taxes, any proposal to cut their tax bills is of special interest.

It may come as a surprise to many that income tax rulings do not apply uniformly throughout the nation.

In eight states whose laws derive from early Spanish and French laws, husbands and wives are allowed to divide income between themselves. This effects certain reductions which income tax payers in states without such a "community property" arrangement cannot take. Another state, Oklahoma, passed a specific law in 1945 to give its residents advantage of the community property principle.

Stanley S. Surrey, tax legislative counsel for the Treasury Dept., has given to the House Appropriations Committee a proposal to apply the community property principle to the other 39 states.

It is an idea which voters endorse, a poll of the nation finds.

In making its poll on the issue, the institute had field reporters ask this question:

"For purposes of income taxes, in eight states a man and wife can divide their income equally between themselves to reduce their income tax. Should married couples in the other 39 states be allowed to do the same thing?"

The replies:

	Pct.
Yes	74
No	10
No Opinion	16

State of Washington Raises Labor Benefits Under New Legislation

Seattle

• • • Benefits accruing to labor in this area, which already is considered to have some of the most favorable labor legislation on its books already, have been materially increased according to E. M. Weston, president of the Washington State Federation of Labor.

Increased benefits provided by the 1947 state legislature in the industrial insurance program are "greater than all of the benefits provided in the last 36 years" according to Mr. Weston. His group sponsored House Bill No. 188 and No. 189 to increase awards to workmen who are injured and to the families of these workers. The former bill provides for future payments and the latter increases the rate of pay for the victims of accidents in the past year.

All injured workmen or their widows pensioned between 1911 and June 13, 1947, who now receive pensions ranging from $20 to $60, will in the future receive pensions ranging from $75 to $100, Mr. Weston reported. After June 13 of this year, workmen will receive pensions for injuries of $75 per month if single and $100 per month if married.

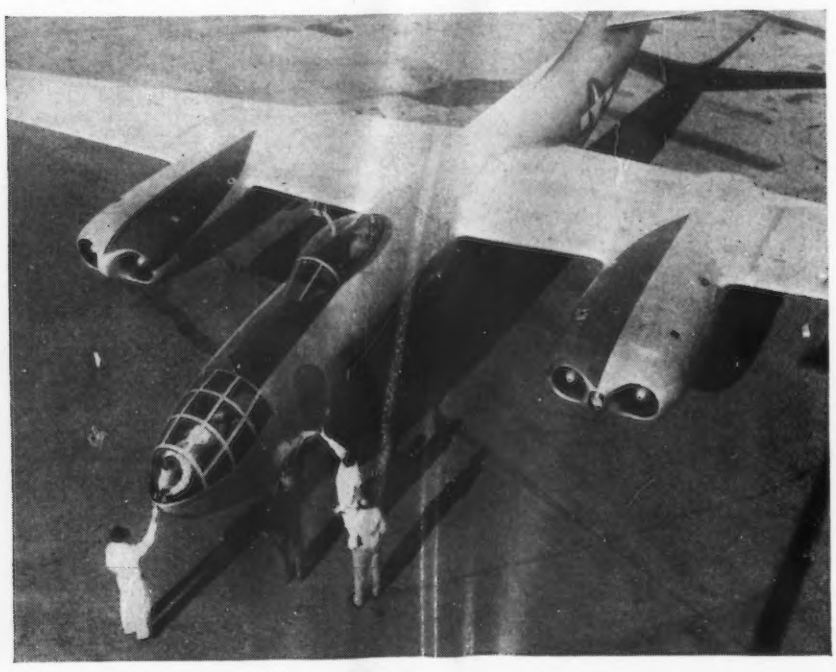
At this time labor and its problems are looming large in the eyes of industrialists who are watching the present contract negotiations between the machinists union, Hope Lodge No. 79 and Washington Metal Trades, Inc. This union is the largest in numbers of the local bargaining agents and generally sets the pace and pattern in wage increases for blacksmiths, boilermakers, and other workers in Seattle shops. Last year, after this group had reached a settlement with their employers, the other unions signed up on very similar terms and without too much additional argument.

Negotiations started 2 weeks ago and the two groups are scheduled for another session this week. Up to the present, negotiations have taken on the color of a sparring match between two heavyweights, with both sides feeling out the other to see just how far they can go. A few preliminary proposals have been made by both sides but none of the heavy blows have as yet been struck.

There is a general feeling among employers that any increase granted among employees will be relatively small as they believe the wage peak has been reached and that industry would be unable to carry any heavier load.

Negotiations between the aeronautical mechanics union and the Boeing Aircraft Co. are continuing, although the contract between the two groups expired last week. There has been no work stoppage and seven weeks of negotiations have not as yet developed any meeting of minds. Most of this period has been spent in working out seniority problems, a matter that both the company and the union believe needs readjusting.

FIRST JET BOMBER: *North American Aviation's XB-45, the first 4-jet engine bomber to fly in the United States. So narrow is the fuselage that pilot and co-pilot sit in line instead of beside each other. For ease of accessibility the engines are set completely ahead of the leading edge of the wing.*



Western Miners Union Struggle Still Raging

Salt Lake City

• • • Appointment by the national CIO of a fact-finding committee to investigate the controversy over alleged communist influence inside the International Union of Mine, Mill & Smelters Workers has temporarily stayed plans for organizing a new union in the Utah-Nevada district, but the internal struggle is still going on.

Spokesmen for the IUMM&SW executive board have taken the position that while the international union has indorsed the investigation, it is not committed to accept any recommendations that the fact-finders might make; that the union retains full autonomy and will continue in that status regardless of the findings of the committee; that the door is already closed to affiliation of seceding locals with the CIO or any of its international unions.

In effect they are claiming that the investigation hasn't and isn't going to change a thing, though they do not put it that bluntly. They insist also that the investigation is aimed at the secessionist movement rather than at communism.

Cleaning Machines for Sale

Washington

• • • WAA is offering for sale about $2 million worth of equipment used in war plants for the removal of dust from air at fixed prices ranging from 40 pct to 75 pct of acquisition cost, depending upon condition. The dust removing equipment is of various process types which cost the government $250 to $15,000 per unit.

FTC Moves to Restrict Brass, Copper Control by Producers

Washington

• • • **Legislative action** aimed to protect the smaller and nonintegrated fabricators of copper products, as well as steps by the government's executive department to prevent formation of either private or government cartels, is urged by the Federal Trade Commission in its report to Congress on the copper industry.

What the FTC is seeking is amendment of the Clayton Act in such a way as to provide a really potent weapon with which the Commission could effectively block further dominance of the copper industry by a few firms, a trend which, the FTC charges, is "progressively" increasing.

"The seriousness of the copper problem, both as to its current and long range aspects, and particularly the relative threat of a possible outbreak of panic bidding for copper, point to the immediate need for the legislative and executive branches of government to consider whatever steps, domestic and foreign, may be feasible to protect the interests of nonintegrated fabricators," says the report.

"Particularly in the international field," the FTC adds, "the need exists and the time appears opportune for the United States to take an energetic position in opposition to the resurrection of international cartels, either government or private."

Under the Act, theoretically the FTC has the power to block attempts at monopoly by preventing acquisition of voting stock. However, the Commission complains, this power is virtually worthless unless it also has the authority to prevent the purchase of corporate assets.

At present, under a Supreme Court decision in 1926, the Commission has only the power to force divestiture of the stock of the former competing corporation. This stock would be worthless and the action is meaningless, it is pointed out, if the business and assets have been transferred to the purchaser in the meantime.

"There are indications that restrictive policies in production and discriminatory policies in distribution commonly associated with monopoly or cartel controls

Allege Three Mine Producers Control Domestic, Foreign Markets, Fabrication

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are important factors in the current and possibly continuing shortage of basic materials and high prices," the report continues.

"The copper situation is particularly serious (in this respect) not only because of the concentration of controls of ore reserves, productive capacity and acquisition of fabrication operations, but because the domestic supply is entirely inadequate to meet the demands of high level production and employment."

Copper consuming industries operating at the 1937 levels of production require a minimum of 90,000 tons monthly or roughly 1,000,000 tons annually of virgin copper, it was pointed out. However, production has not maintained that pace, according to CPA, which gives 1946 production as approximately 600,000 short tons. CPA does estimate, however, that last year's production would have been nearer 800,000 tons had it not been for strikes in the industry and other work stoppages which may have affected production indirectly.

Production of even the 1937 levels is not likely to be maintained, FTC holds. In addition, although copper miners have succeeded to some extent in obtaining higher wages, the amount offered is doing little in the way of attracting new workers for the mines.

Along with decreasing production, the FTC report says, there has been a progressive increase in the concentration of control in the hands of a few interests—more specifically the Kennecott Copper Corp., Phelps Dodge Corp., and the Anaconda Copper Mining Co.

As of 1945, the report goes on, the "Big Three" controlled approximately 21.4 million tons or 83 pct of known reserves in the United States; in addition, the United States was also one of three nationalities controlling a similar percentage of the world's known deposits. Of the American reserves, the report showed, Kennecott controlled about 10 million tons, Phelps Dodge about 7 million, and Anaconda about 4.2 million.

However, it emphasizes, this does not reflect the full restrictive situation. The Big Three not only dominates the domestic mining, smelting and production of refined virgin copper but they also have become extensively engaged in the field of primary fabrication of copper and brass products.

This policy was initiated by Anaconda in the early 20's through acquisition of facilities in the fabricating field, a practice which was later followed by both Kennecott and Phelps Dodge. Thus, the Commission finds, the fabricators who furnish the direct market for raw copper have largely been absorbed by the "Big Three," leaving the independents only the foreign markets as a reasonably free field of copper supply. Even foreign sources, the FTC finds, are dominated by the chief producers in the United States, and imports are subject to the 4¢ per lb excise tax.

In the light of its findings, the Commission reaches the conclusion that the "Big Three's" fabricating activities leave independent fabricators in a very poor position during periods of high demand and largely dependent upon scrap and the tariff-restricted imports as sources for raw materials. Obviously, in the opinion of

Summary of World Copper Reserves (1945)

Country	Metal content, 1000 short tons	Pct of World Total
United States	29,220	26.4
Canada and Newfoundland	7,739	7.
Mexico	600	.5
Total North America	37,559	
Bolivia	40	.04
Chile	25,900	25.3
Peru	2,526	2.2
Total South America	28,466	
Africa	28,648	25.9
Asia	1,880	1.7
USSR	9,000	8.1
Australia	419	0.4
Europe	4,806	4.3
World Total	110,800	

FTC, the prospects of the little businessman for opening a new copper and brass fabricating business or for those already established to develop and expand are practically nil.

Making the matter worse, the report concludes, the disappearance in 1947 of government stockpiles and such inventories as the mills were able to build up leaves the industry with the choice of one of three alternatives—(a) either shrink production of copper goods to meet current production levels or (b) attempt to augment their raw material supply through bidding for foreign supplies or (c) substitute aluminum or other scarce metals insofar as possible and practical for copper.

Britain Hopes to Get Big Scrap Shipments From Germany

Estimates Run to 5 Million Tons In Next 5 Years; Subsidy Will Hold Price Down

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By JACK R. HIGHT
European Editor

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London

• • • **The British steel** industry, cut off from its normal import sources on the east coast of the United States, may have to depend on Germany for 2½ to 5 million tons of iron and steel scrap during the next 5 years. Actual costs of such an operation are not the determining factor since the industry operates under a controlled "cheap scrap" program since 1937.

Scrap prices were limited by agreement with the British steel industry as early as 1937, when the effects of the rearmament program first began to be felt in the scrap market. In September of 1939 official government action froze prices of scrap material at the levels of that date, and the only increases which have been made since then have been to adjust for increases in freight rates.

The overall government "cheap scrap" policy which has been pursued since that date has been a part of the effort to prevent inflation by keeping steel price levels within bounds, and seems certain to be continued. Scrap dealers have passed the increasing costs on to the producers to account for partial recovery. Thus, when in prewar days the dealer may have been paying $4 a ton to get certain material from the scrap producer, today the producer is paying the dealer a similar amount to haul the stuff away.

The normal scrap generated in the U. K. is not sufficient for the British steel industry's needs. During the war the government aided uneconomical collection by indirect subsidies and special collections such as rail fences and blitz material. Since the end of the war, arrangements have been made by the government to bring back scrap from army dumps overseas, to raise the sunken ships from the Normandy beaches, and to collect scrap in Germany. Quite regardless of the costs that may be involved, the scrap is sold to a dealer—where processing is required—at a price that will allow him a decent margin for handling the material, and still sell it at the controlled price.

Another factor which is proving extremely lucrative whenever practicable is the rehandling of material bought as scrap to be sold as usable steel. Accurate estimates of how much of this business is being done have not been arrived at, but it is certain that in the face of a tight steel supply position there are considerable tonnages of merchant bars and other products which require straightening or some other treatment, and which may then be sold to small users who in normal market conditions would be using only new steel. Selling small quantities of material to very small scale consumers makes it possible to sell the material at almost any price the "scrap" dealer cares to ask, quite regardless of the ceiling price on new material.

Britain is depending heavily upon the import of scrap from Germany in the next few years to replace the material that in prewar days came from the east coast of the United States. After all of the vague estimates of exactly how much scrap steel is actually available in Germany are completed, conservative sources here guess that the British steel mills may depend upon 500,000 to a million long tons of scrap per year for the next five years. This figure allows considerable latitude, but must take into account all of the wide invariables which include the political situation in Germany, the final determination at the Moscow conference of the ultimate size of the German steel industry, the availability of labor in Germany, and many others.

The maximum use has been made of prisoner of war, native, and army labor in Germany for the handling of scrap, but how much of this may be expected to go on in the future is also indefinite.

The use of native labor and the assistance of German scrap dealers is also a part of the program, but as in all such use, the low food ration makes it difficult for Germans to undertake the hard physical labor in the handling of scrap. As so often happens in the steel industry, material in hand is always in danger of being used by German dealers as a hedge against an inflation ridden, worthless currency, and thus a constant pressure is necessary from military government sources to keep the scrap moving rather than allowing it to gradually accumulate in the hands of German dealers.

Probably the most disturbing long term prospect of the British steel industry is the ultimate future of the importation of scrap after the German supply gradually dries up. No one knows for sure exactly how long it may be possible to draw off half or three-quarters of a million tons of scrap from Germany, but the increasing difficulties of moving countless tons of other rubble to enable the steel to be moved will put a definite limitation on the years involved.

Most British dealers agree that in light of postwar conditions the eastern markets in America will never again be able to ship in prewar quantities except possibly during conditions of a slump in America. Where in this case England will find the scrap it needs is the unanswerable question of today. There is a possibility, of course, that it may at some time affect the very character of the British steel industry itself.

The London ECONOMIST

Russia—"So Poor—and So Plentiful"

Reprinted by special permission to further understanding on how political and economic affairs are viewed in London.

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IT is perplexing to watch the strange changes in the general public's opinions on Russia's economic as well as military strength. In the later phases of the war, and for some time after it, the popular imagination seemed hypnotized by the picture of the eastern giant striding across the continent, with some inexplicable and irresistible force. By that time General Smuts' famous saying about the "two colossi"—the USA and the USSR—recurred like a refrain in almost every comment on Russia; and the word "inexhaustible" was invariably coupled with every mention of Russian resources.

The fashion has since changed. In recent months Russia's weakness has been impressing itself upon the public mind and providing the topic for guesswork and comment. Attention has been centered on Russia's economic difficulties, now quite often seen through magnifying glasses. Such periodical swings of opinion are caused by the paucity of free and first-hand information about that country. They represent extreme reactions from previous views that have somehow come to be disproved by the known facts.

It has been rather difficult to reconcile the picture of the irresistible Russian giant with the sight of drab Russian misery that has become familiar to half of Europe; and so the public is now inclined to ascribe "feet of clay" to the mysterious and mystifying colossus.

Which of these pictures is the correct one? Each is partly true and partly misleading. An old Russian poet once epitomized the riddle in an apostrophe to Mother Russia: "Thou art so powerful and thou art so helpless; thou art so poor and thou art so plentiful, Mother Russia." The saying is not yet out of date—even after the 5-Year Plans and the hoisting of the Russian flag on the Reichstag. Any realistic appraisal of Russia must still balance its strength against its weakness.

The news that has come from Moscow in recent weeks has all tended to emphasize, even sensationally overemphasize—the elements of weakness. For several months a spate of grim statements and grave warnings about the economic situation has been coming from official Soviet sources.

Late last year the government set up an extraordinary "Board for Kolkhoz Affairs." This was superimposed on the now reformed Ministry of Agriculture and headed by Mr. Andreev, a very influential member of the Politbureau, one of the chief authors of the collectivization in the early thirties. It was admitted that collective farming was suffering from considerable disruption which called for emergency measures.

Soon afterward came the announcement about the calamitous drought, "the worst since half a century." Simultaneously the *Gosplan* published the results achieved in industry in the first year of the new Plan: It became known that in many branches of industry the planned targets had not been reached. Last month's Budget session in the Supreme Soviet was filled with the most alarming statements and speeches the Russians had heard since the late twenties. The budget speech of Mr. Zverev did not strike the usual optimistic tone. The Minister of Agriculture, Mr. Benediktov, and Mr. Andreev vied with one another in painting a dark picture of agriculture.

AT the same time, the Central Committee of the Party met, and Stalin apparently made several important speeches at its closed sessions—the speeches have not been reported in the press and only Mr. Andreev referred to them in public. On Mar. 1, the campaign culminated in a statement issued by the Cabinet itself.

At the Supreme Soviet most Ministers responsible for economic departments were severely criticized by deputies—a most unusual thing in Russia—and, still more unusually, by their own colleagues in the government. A reshuffling in the administration followed, in which the most striking event was the appointment of Mr. Kaganovich to be first Secretary of the Party in the Ukraine, that is, the boss of the Ukraine, in place of Mr. Khrushchev. Mr. Khrushchev, however, has not been purged—he has remained Ukrainian Prime Minister.

There can be no doubt that the Soviet Union is in the throes of an economic crisis. The salient facts have been set out in the government's statement of Mar. 1. The reconversion of Soviet industry to peace has in the main been completed; but the process has not been carried out efficiently. "The gross output of the entire civilian production was 20 pct higher in 1946 than in 1945." This has a reassuring ring, but it really means that the first year of the new plan has ended in failure. Since plant and labor diverted to civilian production must have increased by much more than 20 pct, the increase in gross output by only 20 pct indicates a steep decline in productivity.

The situation is worst in the former occupied areas. There industrial output increased by 28 pct, but it "did not even reach half the prewar production." This is a euphemism—output is probably well below the 50 pct. In the victorious Soviet Union, the devastation and unsettlement of the war are being overcome at a pace not much quicker—so far—than the rate of economic rehabilitation in Western Germany.

(CONTINUED ON PAGE 132)

FTC Submits Report to Congress on Trend of Corporate Mergers

Washington

• • • **Renewing its** request for amendment of the Clayton Act to prevent acquisition of corporate assets, the Federal Trade Commission has submitted a report to Congress on the present trend of corporate mergers and acquisitions, which reveals the acquisition of more than 1800 manufacturing and mining companies in the period 1940 through 1946, most of them having disappeared during the last 3 years.

The report gives a clean bill of health to metals producers in regard to the acquisition of primary production facilities, but states that there have been important acquisitions of fabricating and manufacturing facilities at the expense of small business. FTC also views with some alarm the acquisition of steel finishing facilities by producers of durable goods.

The largest number of acquisitions were found to be in such fields as food, textiles, chemicals, petroleum and coal products, and certain types of machinery.

In making the report, FTC points out that it does not suggest or imply that the acquisitions referred to involve any violation of the antitrust laws. It further states that the upward merger movement and attendant wiping out of small businesses makes congressional action imperative.

FTC now has the power to prevent the acquisition of voting stock where such purchases would lessen competition or tend to create a monopoly, but it cannot prevent the acquisition of physical assets. Such authority would be granted FTC under a bill now before the House Judiciary Committee. Similar legislation was approved by the Committee during the last session of Congress but was not voted upon by the House.

The Commission report found that the asset value of the concerns acquired in the period 1940-46 amount to $4.1 billion, or nearly 5 pct of the total asset value of all manufacturing corporations in 1943—the latest year for which FTC found such data available.

Okays Metal Group on Primary Acquisitions But Shows Alarm Toward Others

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The merger movement has been particularly pronounced since VJ-Day, according to the report. In the fourth quarter of 1945 it reached the highest level in the last decade and a half. This movement, says FTC, parallels that which took place at the end of World War I.

Acquisitions by selected industries reported by FTC are shown in the following table:

Mergers and Acquisitions of Manufacturing and Mining Concerns by Industry, 1940-46
(Selected Industries)

Industry of Acquiring Company	Total Number of Firms Merged or Acquired	Percentage
Chemicals	171	10.3
Petroleum and Coal Products	133	8.0
Primary Metals		
Iron and Steel (basic)	93	5.6
Other primary metals	27	1.7
Fabricated metals	87	5.3
Nonelectrical Machinery	136	8.2
Electrical machinery	88	5.3
Transportation equipment	126	7.6
Professional and scientific instruments	19	1.2
Stone, clay and glass products	37	2.2
Mining	50	3.0

All data included in the report was prepared by the Dept. of Commerce, which in turn based its information on actions reported by Moody's Investors Service and Standard & Poor's Corp.

The total number of firms acquired or merged since 1940 is set at 1833, but FTC points out that this does not cover a larger number of small firms not included in reports of the two companies mentioned above.

A striking feature of the current merger movement, says FTC, is the importance of acquisitions in several traditionally "small business" industries. Selected as an outstanding illustration is the steel drum industry.

"Before the war," the report states, "only two basic steel concerns were in the field, which numbered 26 producers in all, and these accounted for less than 10 pct of the output. But as a result of recent acquisitions, 7 of the large basic steel producers are now in possession of 87 pct of the heavy steel drum and barrel capacity, while the remaining 13 pct is divided among 10 independents. On a regional basis, the concentration is even greater. The basic steel companies now hold all of the capacity on the Pacific Coast and the St. Louis areas; 95 pct in the Atlantic Coast, Houston and New Orleans areas; 86 pct in the Chicago area; and 68 pct in the Cleveland-Pittsburgh area. Only in the Cleveland-Pittsburgh and Chicago areas are the independent companies still able to produce in any significant volume."

The Commission also found that nearly one-third (32 pct) of the companies merged since 1940 have been absorbed by the very largest corporations — those with assets exceeding $50 million. Another 41 pct of the total was taken over by corporations with assets ranging from $5 million to $49 million. The small firms, those with less than $1 million of assets, made 11 pct of the acquisitions.

The largest firms, those with assets of $50 million and over, acquired an average of some four firms each, while the smallest firms, with assets of under $1 million acquired an average of less than one and a half firms each.

"The predominant role of the giant corporations in this current merger movement is strikingly illustrated," continues the report, "by the fact that since 1940, 71 out of 100 largest manufacturing corporations have bought up 278 concerns, or 17 pct of all companies acquired; and in addition 49 of the second 100 have purchased 175 firms, or 10 pct of all the companies acquired. In other words, 120 out of the top 200 corporations have bought up 453 companies, or 27 pct of the total."

Included among the 18 corporations, reported by FTC, which made the largest number of ac-

quisitions together with their 1944 ranking by assets among the 1000 largest manufacturing corporations are the following:

Acquiring Company	Number of Firms Acquired 1940-1946	Ranking Among 1000 Largest Manufactur'g Corporations
Continental Can Co..	13	72
Food Machinery Co..	12	143
Celotex Corp.	9	566
General American Transportation Corp.	9	109
Noma Electric Corp..	9	not among first 1000

Note: Five primary metals producers included in the 18 corporations listed by FTC are shown in a separate tabulation.

Fully 90 pct of all the firms bought out since 1940 held assets of less than $5 million, and 70 pct had less than $1 million of assets. Only 4 pct of the total number of acquired firms had assets of over $10 million.

"In short," says FTC, "the figures indicate conclusively that the major impetus behind the current merger movement has been the desire of giant corporations to consolidate their wartime gains and to expand the scope of their domination through acquisitions of smaller, independent enterprises."

As to the economic effects of the recent merger movement on the competitive structure of the American economy the report shows that the "majority of the actions (60 pct) have been horizontal acquisitions, that is, the purchase of firms engaged in roughly similar lines of production. Vertical acquisitions, which involve either 'backward' purchase of suppliers or the 'forward' purchase of further fabricating facilities, have accounted for 17 pct of the total number. And conglomerate acquisitions, in which there is no discernible relationship in the nature of the business between the purchasing and the acquired firms, represented 22 pct of the total number.

"**A major result** of horizontal acquisition is to bring together firms producing (1) identical products for similar markets or (2) products which might be substituted for one another.

"Obviously, many horizontal acquisitions have been instituted by the desire of large concerns to eliminate troublesome competitors producing a similar line of goods.

"Vertical integrations have a particularly severe effect upon small business during periods such as the present which are plagued by a shortage of raw materials, components, etc. During such periods, large firms frequently reach backward to acquire important suppliers, and in so doing, reduce the amount of supplies available for small independent business.

"Similarly, many large firms find it advantageous to acquire further fabricating and finishing facilities in order to secure the higher profit margins which are generally characteristic of the more highly fabricated products.

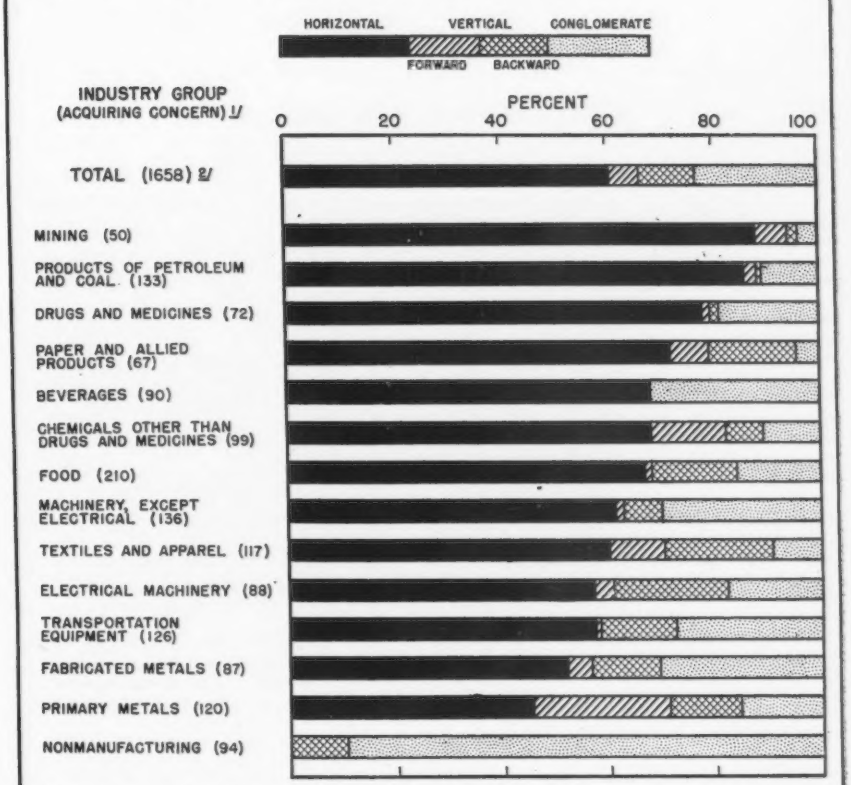
"**The third avenue** of expansion, the conglomerate acquisition, contributes greatly to the concentration of economic power, since it results in the absorption of many small firms in different and often completely unrelated lines of activity.

"The traditional rationalizations for mergers are less applicable to this type of acquisition of firms in completely dissimilar and unrelated fields than to the horizontal and vertical types because of the great difficulty in obtaining thereby any important efficiencies of production and distribution."

Forecasting future trends, FTC says that "with the completion of the transition to a peacetime economy, certain changes would probably take place in the pattern of acquisitions. On the one hand the easing of material shortages would tend to result in a decrease in the relative importance of vertical acquisitions. But, on the other hand, this decrease probably would be offset by a rise in horizontal acquisitions as competitive pressures become more acute and the removal of annoying competitors becomes an increasingly desirable economic objective. Simi-

DIRECTION OF EXPANSION INDICATED BY MERGERS AND ACQUISITIONS OF MANUFACTURING AND MINING CONCERNS

CLASSIFIED BY INDUSTRY OF ACQUIRING CONCERN, JANUARY 1940 — DECEMBER 1946



1/ THE FIGURES IN PARENTHESES AFTER EACH INDUSTRY GROUP INDICATE THE NUMBER OF CONCERNS ACQUIRED.
2/ INCLUDES GROUPS NOT SHOWN SEPARATELY IN CHART.
SOURCES OF DATA: U. S. DEPARTMENT OF COMMERCE, BASED UPON ACTIONS REPORTED BY MOODY'S INVESTORS SERVICE AND STANDARD AND POOR'S CORPORATION. 46-780

larly, conglomerate acquisitions also would tend to rise, as many large corporations would seek outlets in practically any apparently profitable field for their large accumulations of war profits."

In the primary metals field horizontal acquisitions were found to be relatively less important since 1940 than in any other manufacturing industry. This is attributed to the lack of small companies in the field and the government-financed wartime expansion program. It is pointed out, however, that while the "big steel companies have acquired most of their primary producing facilities from the government, they have acquired new fabricating facilities in large part from small independent companies, particularly in the field of steel barrels, drums, culverts, etc."

Primary Metals Producers Listed as Having Acquired Important Firms, 1940-1946

Acquiring Company	Number of Firms Acquired	Ranking Among top 1000 Corporations
*Dresser Industries, Inc.	10	295
*U. S. Steel Corp.	9	3
*Bethlehem Steel Corp.	9	6
*Jones & Laughlin Steel Corp.	9	37
*Barium Steel Corp.	9	not among top 1000
American Rolling Mill Co.	6	66
Inland Steel Co.	6	61
Republic Steel Corp.	5	24
American Smelting & Refining Co.	4	151
Allegheny Ludlum Steel Corp.	3	187

*Indicates companies also listed among the 18 corporations which made the largest number of acquisitions.

FTC notes that "the third and sixth largest corporations in the country—U. S. Steel and Bethlehem—each acquired 9 different firms. In addition to purchasing several steel drum outfits, U. S. Steel also bought a prefabricated housing concern, a cement company, and a producer of petroleum producing equipment. Bethlehem likewise went into both the steel barrel and petroleum equipment fields."

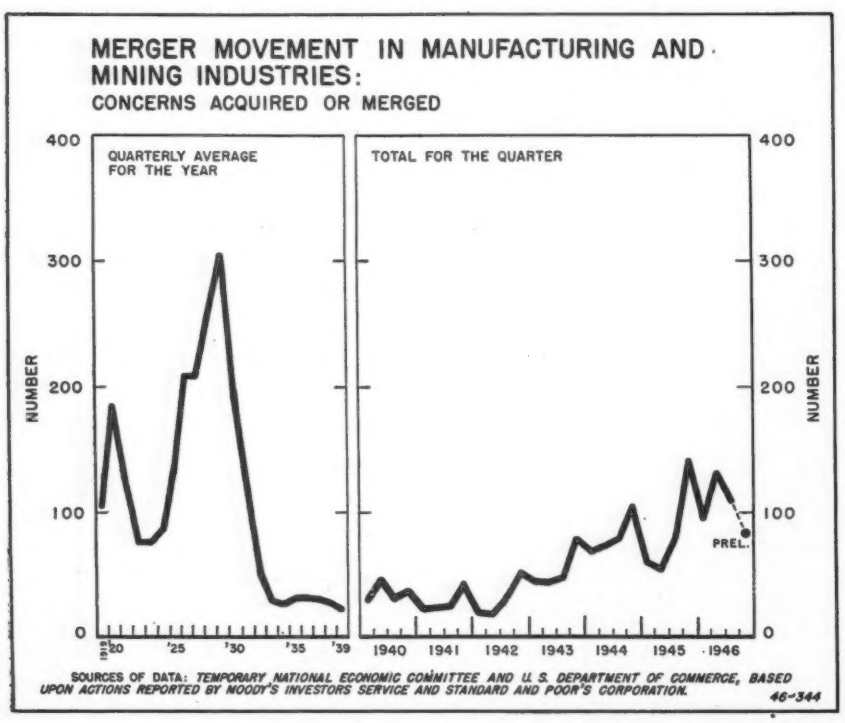
In fabricated metals, machinery, and transportation equipment, FTC found that most of the acquisitions were of the horizontal or of the backward vertical types. The report states that the importance of horizontal acquisitions reflects the high degree of interchangeability of metal working facilities, such as machine tools, while the large number of backward vertical integrations is a result of the efforts of fabricators to obtain primary materials and components.

The following firms were found to be among the most active acquiring concerns in this general area:

Acquiring Company	Number of Acquisitions	Ranking Top Among 1000 Largest Manufactur'g Corporations in 1944
Fabricated Metals		
Continental Can Co.	13	72
Woodall Industries, Inc.	5	839
American Chain & Cable Co.	4	239
Rheem Mfg. Co. (1/3 interest acquired by Bethlehem Steel Nov. 1943)	4	369
Machinery, except electrical		
Food Machinery Corp.	12	143
Joy Mfg. Co.	5	795
Van Norman Machine Co.	4	not ranked among top 1000
Eureka Vacuum Cleaner Co.	3	not ranked among top 1000
Lynch Corp.	3	not ranked among top 1000
Electrical Machinery		
Noma Electric Corp.	9	not ranked among top 1000
International Detrola Corp.	6	598
Aireon Mfg. Corp.	4	655
Emerson Radio & Phonograph Corp.	4	603
Federal Machine & Welder Co.	4	632
Westinghouse Electric & Mfg. Corp.	3	17
Transportation Equipment		
General American Transportation Corp.	9	109
H. K. Porter Co., Inc.	7	543
Aviation Corp.	5	not ranked among top 1000
Consolidated-Vultee Aircraft Corp.	4	29
Curtiss - Wright Corp.	3	11
Liberty Aircraft Products Corp.	3	739
Republic Industries, Inc.	3	101

Cited in these fields are primarily purchasers of suppliers of materials and components.

FTC also states that a "very significant aspect of the merger movement, as a whole, was the purchaser of sheet steel producers by three large manufacturers of electrical machinery." The following purchases are listed: Mahoning Valley Steel Co., by General Electric; Superior Sheet Steel Co., by Borg-Warner; and Andrews Steel Co., by the International Detrola Corp.



Okays Exports to Hungary

Washington

• • • **Exports to** Hungary of all commodities not in scarce domestic supply is now permitted under general license.

This action is in line with the U. S. Government policy that Hungary be treated as other independent and democratic states, according to the Dept. of Commerce.

Hungary was formerly in the "E" category, which mean that all exports valued at more than $25 required special export licenses. It has been transferred to the "K" category.

Employers Report Need For 92,000 More Workers by May 15

Plants Surveyed in Kentucky, Michigan, Ohio Show No Signs of Recession

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Cleveland

• • • **Employers in** 3871 plants in Kentucky, Michigan and Ohio indicate a need for 92,000 more workers by May 15, according to J. K. Johnson, U. S. Employment Service regional director.

"The current 'tightness' of the labor market, the continued shortage of certain skilled workers and the fact that many employers have been unable to achieve their anticipated employment over the past 12 months leads us to believe that less than half the additional required workers will be on the industry's payrolls by that time," he added.

Mr. Johnson pointed out that these employers' estimates, however, do not indicate that the much talked about recession is in sight.

"Employment in plants surveyed by public employment offices in Kentucky, Michigan and Ohio showed no substantial change between mid-November, 1946, and mid-January, 1947," he reported.

"This confirms our prediction in THE IRON AGE, Oct. 3, 1946, where we indicated that employment in this region would reach a peak at the end of the year and level off."

The 3871 plants included in the survey employed 2,337,800 people in mid-January, a decrease of less than one-half of one pct since November. The normal seasonal decrease in some industries in January was offset by employment increases in others.

The slight decrease from November to January is accounted for principally by the reduction of employment in nonmanufacturing activities where the heaviest seasonal layoffs were experienced. Nonmanufacturing employment decreased from 549,000 in November to 539,000 in January. Late spring and early summer seasonal change in nonmanufacturing activities is expected to increase employment to 556,700 by May 15.

Manufacturing employment in almost 2300 establishments remained relatively stable during the November-January period, increasing less than one-half of one pct. Employers engaged in manufacturing expect to add 74,000 workers to their payroll by May 15. This is about 80 pct of the total number of additional workers the 3871 establishments expected to employ by that time.

Reports from 159 Ohio plants in the primary metal industries engaged in smelting and refining ferrous and nonferrous metals indicated remarkable employment stability for the November-January period. In mid-November these plants employed 158,600 workers. Employment by mid-January changed by only 400 to 158,200. Employers in these industries indicated that an additional 4400 workers would be required by May 15.

Mr. Johnson pointed out that conclusions based on these employment data are further verified by the activities of the public employment offices in the three states in the region insofar as they relate to the number of job openings placed with the public employment offices by employers.

Job registrants have declined from 432,600 in January 1946 to 284,800 in January 1947. While this decline was expected as industry reconverted in 1946 and swung into high gear, it is significant that there has been little change in the number of job seekers for the December 1946-February 1947 period when registrations totaled between 260,000 and 286,000.

A further indication that employment is reaching peak proportions is evidenced by the number of unfilled job openings held by public employment offices for the past four months. The 46,344 openings available at the end of November 1946 have shown a steady decline so that by February 1947 the same offices had 32,129 job openings. Most of these openings are for replacements and when filled will not represent net additions to the employment total.

The ration of job applicants to job openings has declined from 13 to 1 in February 1946 to 9 to 1 in February 1947. The apparently anomalous situation of 9 registered workers for every job opening is explained by the fact that applicants and jobs do not "match" in such important factors as sex, occupational characteristics and skill.

Failure to reach agreement concerning wage rates and working conditions may retard the "matching" of men and jobs in some cases. Many of the job openings are those which employers have been unable to fill at the gate because they were for skilled work-

Actual and Anticipated Employment in 3871 Plants in Michigan, Ohio and Kentucky
November 1946—May 1947
(By Sex)

	Number of Plants	Actual				Anticipated			
		November 1946		January 1947		March 1947		May 1947	
		Total	Female	Total	Female	Total	Female	Total	Female
Michigan	1195	992,700	204,900	990,400	201,500	1,022,900	207,000	1,035,400	208,800
Ohio	2316	1,212,100	319,700	1,210,800	315,300	1,239,900	323,200	1,249,900	325,900
Kentucky	360	135,600	37,600	136,600	37,500	142,400	39,300	144,100	39,800
Total	3871	2,340,400	562,200	2,337,800	554,300	2,405,200	569,500	2,429,400	574,500

Industrial Briefs . . .

• TO REPRESENT—The Standard Tube Co., Detroit, announces the appointment of Metal Goods Corp., headquarters at St. Louis, as sales representatives and distributors for their products in the States of Arkansas, Colorado, Kansas, Louisiana, Missouri, Nebraska, Oklahoma, Tennessee and Texas.

• ACQUISITION — Moffett Mfg. Co., Coatesville, Pa., a recent newcomer to the weldments and special machinery field, have acquired the Craig Ridgway & Son Co., makers of steam hydraulic machinery.

• STERLING TOOL BUILDS — Plans for the new plant to be constructed by Sterling Tool Products Co., Chicago, manufacturer of portable sanding machines, have been announced. The one-story combined factory and office will contain 95,000 sq. ft of floor space when completed.

• BUYS PRESS PLANT—Acquisition of new facilities by the Cincinnati Shaper Co. for the manufacture of heavy metalworking machinery has been disclosed by the announcement of WAA that the firm has purchased the shears and press plant which it operated for the government during the war. The sales price of $608,000 included land, buildings, and machinery and equipment.

• PLANT ADDITION—The Jamestown Metal Equipment Co., Jamestown, N. Y., plans to build a $200,000 addition to its plant. The new building will be one story, of brick and steel construction, with 60,000 sq ft of floor space.

• ACQUIRES REROLLING MILL—The Borg-Warner Corp. will take over the Franklin, Pa., steel works of the Chicago Railway Equipment on May 1. Acquisition of the rerolling mill, which produces a variety of steel shapes, including rounds, flats and fence posts, is expected to attain a capacity of 75,000 tons a year and employ approximately 600 people. The mill has been completely modernized and will be operated under the name of the Franklin Steel Div. of Borg-Warner Corp.

• TO PRODUCE HEATERS—Clark electric water heaters are to be produced on the West Coast by McGraw Electric Co. of Chicago, manufacturers of Toastmaster products. A new 20,000 sq ft plant is expected to be in operation in April at Azusa, Calif. Charles B. Mutter, formerly chief engineer for the McGraw Co.'s Chicago plant, will have charge of the Azusa factory.

• TO INCREASE OUTPUT — To help meet unprecedented demands for ceramic oxides, stains and colors, Ferro Enamel Corp. is increasing its production facilities by 50 pct. This is the first of two steps in a general expansion program to increase Ferro's output of colors. Present plans call for again doubling current production facilities when materials and equipment are available.

• SHIPMENTS INCREASE—Dollar value of porcelain enameled steel plumbing fixture shipments during 1946 increased 1000 pct over the 1945 total, and that of porcelain enameled cast iron plumbing fixtures increased almost 500 pct according to the Porcelain Enamel Institute.

• SWEDISH CONTRACT—The contract for the complete most up-to-date rolling mill equipment for a new steel plant to be erected in Sweden has been placed with The Loewy Engineering Co. The plant will be in operation in 1949, and Loewy's rolling mill will turn out over 700,000,000 lb of rolled steel per year.

• GRANTS LICENSE—The Great Lakes Steel Corp. has announced the licensing of the Sharon Steel Corp., Sharon, Pa., to produce N-A-X high tensile steel and the entire range of N-A-X 9100 series low-alloy steels.

ers for whom a national shortage exists.

Mr. Johnson said that hiring problems such as this are often solved by the preparation and use of job specifications which set forth the basic information about the nature of the jobs to be filled and parallel it with information about the minimum requirements which workers will be expected to meet.

"In many instances this may mean that requirements which have been considered 'desirable' may be changed to 'minimum,' thus making available an entirely new group of workers heretofore unconsidered."

WAA Surplus Inventory Led by Machine Tools In Latest Compilation

Washington

• • • **Machine tools,** having an acquisition cost of $567 million, led 20 general classifications of surplus property in inventory value as of March, according to a listing released by War Assets Administration.

Iron and steel inventories, listed as $128 million, were fourth on the list and nonferrous metals, valued at $68 million, were tenth.

Despite the high demand for steel, little reduction has been made in the inventory over the past 3 or 4 months; WAA officials say that this is because the items now in its inventories are of the types not normally in demand. However, neither the Washington headquarters nor the field offices of WAA have adequate descriptive listings to offer potential buyers.

Confirmed inventory value of the 20 largest categories at the end of February were given as follows (in millions):

Machine Tools	567
Electrical Equipment	151
Clothing and Apparel	139
Iron and Steel	128
Textile Products	93
General Hardware	89
Motor Trucks	89
Internal Combustion Engines	74
Materials Handling Equipment	73
Nonferrous Metals	68
Safety Equipment	61
Metal Forming and Cutting Tools	58
Steam Equipment	57
Valves and Fittings	55
Cutting Tools	54
Metals Processing Equipment	52
Heavy Construction Machinery	48
Electrical Supplies	47
Textile Fabrics	47
Recreational Equipment	45

Construction Steel . . .

• • • Fabricated steel awards this week included the following:

4100 Tons, Philadelphia, Yale & Towne Mfg. Co., to Bethlehem Steel Co., Bethlehem, Pa.

1800 Tons, State College, Pa., Penn State College, two dormitory units, through Henry E. Baton, to Bethlehem Steel Co., Bethlehem, Pa.

500 Tons, Oliver, Wis., decking for St. Louis River drawbridge to American Bridge Co., Pittsburgh.

375 Tons, Dallas, Texas State Highway Bridge to Virginia Bridge Co., Roanoke, Va.

350 Tons, Port Gibson, Miss., Mississippi State Highway Bridge to Virginia Bridge Co., Roanoke, Va.

350 Tons, Los Angeles, construction at berths 179-180, Wilmington, under Spec. 1072, to Pacific Iron & Steel Co., Los Angeles.

300 Tons, St. Paul, Minn., beam span for Great Northern R. R. to American Bridge Co., Pittsburgh.

125 Tons, Seattle, health science center at University of Washington, through J. C. Boespflug Construction Co. to Isaacson Iron Works, Seattle.

100 Tons, Caribou, Me., two power stations for Maine Public Service Co. to Phoenix Iron Co., Phoenixville, Pa. through Charles T. Main, Inc., Boston engineers.

• • • Fabricated steel inquiries this week included the following:

2000 Tons, Passaic River, N. J., New Jersey Dept. of Highways, bascule bridge and approach spans, to be rebid.

1150 Tons, Marcus Hook, Pa., four 80 million barrel tanks for Graver Tank & Mfg. Co.

1075 Tons, Lansing Township, Ill., continuous beam bridge.

715 Tons, Thornton Township, Ill., continuous beam bridge.

625 Tons, Thornton Township, Ill., continuous beam bridge.

500 Tons, Philadelphia, E. I. duPont de Nemours Co., laboratory building, Mar. 25.

500 Tons, Cambridge, Mass., senior dormitory for M.I.T.

400 Tons, Cranston, R. I., print works plant.

300 Tons, Burton, Mich., two bridges, Service & Supply Co., contractors.

245 Tons, White Eagle, Okla., power plant.

200 Tons, Miles City, Mont., veterans' administration hospital, Fort Pect district, Corps of Engineers, bids to Apr. 28.

200 Tons, Davis Junction, Ill., F1-142-17, for Winnebago Co.

200 Tons, Ft. Collins, Col., 72 in. pipeline specification 1710.

150 Tons, Milwaukee, factory building for Milwaukee Envelope Co.

110 Tons, Bensonville, Ill., Kieck Hefer factory building.

100 Tons, Casper, Wyo., U.S.S.B. of R. bulkhead gates.

• • • Reinforcing bar awards this week included the following:

900 Tons, Seattle, health science center at University of Washington, through J. C. Boespflug Construction Co. to Northwest Steel Rolling Mills, Seattle.

775 Tons, Los Angeles, construction at berths 179-180, Wilmington, under Spec. 1072, to Ceco Steel Products Corp., Omaha, Neb.

205 Tons, Urbana, Ill., mechanical engineering building, University of Illinois, James McHugh & Sons, Chicago, who was low bidder has been awarded contract.

200 Tons, Urbana, Ill., tunnel, University of Illinois, to J. T. Ryerson & Sons.

• • • Reinforcing bar inquiries this week included the following:

1410 Tons, Seville, Calif., Friant-Kern Canal, Bureau of Reclamation, Denver, Inv. E-33, 190-A, bids to Mar. 21.

1200 Tons, Cook County, Ill., bridges.

1000 Tons, St. Paul, Minn., Hippodrome building.

340 Tons, Los Angeles, undercrossings and approach, Santa Ana Parkway at Euclid Ave. and at Marietta St., California Div. of Highways, Los Angeles, bids to Apr. 17.

275 Tons, Motolius, Ore., North Unit Main Canal, Deschutes Project, Bureau of Reclamation, Denver, Inv. A-30,806-A-1, bids to Mar. 31.

200 Tons, Belwood, Ill., housing project.

125 Tons, Lynn, Mass., school.

125 Tons, Holyoke, Mass., U. S. Connecticut River dike.

125 Tons, Springfield, Mass., U. S. Connecticut River dike.

115 Tons, Seville, Calif., Friant-Kern Canal, Bureau of Reclamation, Denver, Inv. E-33,206-A, bids to Mar. 19.

• • • Plate awards this week included the following:

150 Tons, Brewer, Me., standpipe for water district to Chicago Bridge & Iron Co., Chicago.

• • • Piling awards this week included the following:

100 Tons, Fond Du Lac, Wis., retaining wall to Carnegie-Illinois Steel through C. R. Meyer & Sons.

Raise Spiegeleisen Price

New York

• • • The New Jersey Zinc Co. has announced a price increase of $4 per ton on all grades of spiegeleisen effective Mar. 15. The new prices, f.o.b. Palmerton, Pa., are $43.00 for the 16 to 19 pct Mn grade, $44.00 for the 19 to 21 pct Mn grade, both with 3 pct max silicon. This is the second increase for spiegeleisen since the end of price control. A price of $36.00 was maintained throughout the war for the latter grade which represents about 75 pct of consumption. It is reported that the price increase was required to meet increasing costs which have been more significant in this field than in any of the company's other operations.

Coming Events

Mar. 31-Apr. 2 Midwest Power Conference, Chicago.
Apr. 7 Packaging Machinery Manufacturers Institute, semiannual meeting, Philadelphia.
Apr. 7-10 National Assn. of Corrosion Engineers, convention, Chicago.
Apr. 8-11 American Management Assn., packaging exposition, Philadelphia.
Apr. 14-16 National Machine Tool Builders' Assn., spring meeting, Atlantic City, N. J.
Apr. 14-17 Electrochemical Society, Inc., Columbus, Ohio.
Apr. 14-17 Southern Machinery & Metals Exposition, Atlanta.
Apr. 21-23 American Institute of Mining & Metallurgical Engineers, openhearth, coke oven, blast furnace and raw material committees, annual conference, Cincinnati.
Apr. 28-29 American Zinc Institute, annual meeting, St. Louis.
Apr. 28-May 1 American Foundrymen's Assn., convention, Detroit.
Apr. 29-May 1 Industrial Packaging and Materials Handling Exposition, Industrial Packaging Engineers Assn. of America. Chicago.
May 5-6 National Welding Supply Assn., convention, Philadelphia.
May 6-10 Society of the Plastics Industry, Inc., exposition, Chicago.
May 15-17 Society for Experimental Stress Analysis, annual meeting, Chicago.
May 21-22 American Iron & Steel Institute, annual meeting, New York.
May 26-27 Assn. of Iron & Steel Engineers, annual spring conference, Philadelphia.
May 27 Metal Powder Assn., spring meeting, New York.
June 2-4 American Gear Manufacturers, Hot Springs, Va.
June 9-11 American Coke & Chemical Institute, annual meeting, French Lick, Ind.
June 15-19 American Society of Mechanical Engineers, semiannual meeting, Chicago.
June 16-20 American Society for Testing Materials, annual meeting, Atlantic City, N. J.
June 17-19 Machinery Dealers National Assn., convention, Cincinnati.
June 23-27 American Electroplaters Society, industrial finishing show, Detroit.
July 14-18 American Society of Civil Engineers, Duluth, Minn.

MACHINE TOOLS

. . . News and Market Activities

Estimates Show Fair Machine Tool Business in February

• • • On the basis of preliminary estimates, February proved to be almost as spotty a month for the machine tool industry as the pessimists predicted; shipments surpassed new firm orders by a noticeable margin and cancellations increased slightly.

Dollar-wise, the industry's February showing will probably shape up with shipments of about $24,300,000, new firm orders totaling $16,800,000, cancellations to the tune of $1,760,000, and about $145,500,000 in unfilled firm orders.

New foreign firm orders will probably amount to about $4,200,000, foreign shipments will run about $6,100,000, foreign cancellations will amount to about $972,000 and unfilled foreign orders about $43,700,000.

In January, the industry's shipments were $24,153,612, new firm orders $18,991,174, cancellations $1,502,578, unfilled firm orders $154,759,996. New foreign firm orders in January totaled $5,573,474, foreign shipments $7,175,535, foreign cancellations $265,545 and unfilled foreign orders $46,369,966.

While the margin between shipments and new firm orders seem to be widening, and reliable sources in the industry report that little change in the situation can be expected for at least 60 days, some producers are raising the prices of machines, tools and attachments, which suggests that pessimism in the industry is only skin deep.

Shipments Outstripped New Firm Orders and Cancellations Increased Slightly

o o o

According to the figures, most machine tool builders have about 6 months' orders on the books, and if reports percolating through the trade are any indication, the industry's ambitious plans transcend even the government-owned surplus and the sporadic present. Some builders are now buying surplus machines for rebuilding.

A selection of German machine tools will go on exhibit at Frankford Arsenal, Philadelphia, Mar. 31, under the joint sponsorship of the Office of Technical Services, Dept. of Commerce, Office of the Chief of Ordnance, War Dept., the National Machine Tool Builders Assn. and the Army Ordnance Assn.

Items to be displayed include various types of grinding, rolling, and milling machines, measuring and testing apparatus, and plastics processing equipment. The equipment was brought to this country through the efforts of investigators who have made a study of the German machine tool industry since VE-Day.

In Detroit, new orders for tooling continue to run light, according to the most recent survey by Automotive Tool & Die Manufacturers Assn. Machine tool companies also report a falling off in their backlogs. Refrigerator tooling programs are now about completed and, except in the case of two automobile manufacturers, no extensive new tooling programs are in sight. It has been predicted, however, that enough work may result from the uncompleted auto programs to give a lift to the present work averages of 42 hr a week in association shops, the agency said.

The market for specialized machine tools is reported by New York dealers to be holding its own with a normal backlog of 7 to 8 months' delivery, which, however, at present production rates may be expected to be cleaned up in 3 to 4 months.

In the Boston area bookings of new domestic business are tapering off, according to some manufacturers. They have, however, comfortable backlogs, but in at least one instance laid off a number of employees. However, the fact remains that the Massachusetts machine tool industry is employing 150 pct more people than before the war.

There has been a tendency among some manufacturers to expand lines. One company is making labeling machinery, others plastic equipment and one has absorbed a line of small tools, for which there is good demand. Those making plastics equipment have fared exceptionally well. Export business has been hampered somewhat by transportation and foreign exchange problems, but has grown steadily.

Old Tools for Sale

Washington

• • • **Instructions have been issued to WAA field offices to place on sale through competitive bidding approximately 80,000 obsolete special purpose and overage machine tools for purposes of salvage and scrapping.**

WAA said the primary purpose of the sale was the *salvage of component parts, such as electric motors, dividing heads, chucks and circular tables which are in critical supply.*

At the same time, WAA said, the sale would result in the channeling into the scrap industry some 250,000 tons of scrap from the unsalvageable parts of the machines.

In this offering are machine tools which were designed for and used exclusively in the production of war material and *considered obsolete for peacetime use, and those which were built during* 1921 *or any prior year.*

In addition to this program, WAA is combing its inventory of general purpose tools to offer as quickly as possible those tools which, because of condition, will probably have little value except as scrap.

Offerings in minimum lots of ten tools will be made by most WAA regional offices. Major inventories are held by regional offices in New York, Detroit, Cleveland, St. Louis, Boston and Cincinnati.

NONFERROUS METALS

. . . News and Market Activities

Aluminum Fabricator Established in Brazil

Montreal

• • • **Formation of** a new aluminum enterprise in Brazil is announced by officials of Aluminium Ltd. The new enterprise, Aluminio do Brasil, S. A., will be jointly owned by Aluminium Ltd. and Francisco Pignatari, one of Brazil's leading industrialists. Total assets will exceed $10 million.

Plans call for the development of an integrated aluminum industry, including a modern high-speed rolling mill, to be erected in the State of Sao Paulo, with an ultimate capacity of some 15,000 tons of aluminum sheet per year. Aluminum consumption in Brazil in 1946, largely of imports from Canada, approximated 5500 tons. Brazil's annual ingot aluminum capacity is approximately 2500 tons.

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Copper

• • • **The Patterson** Bill for suspension of the copper tariff for two years, having passed the House, is now in the Senate Finance Committee, from which market observers expect it to be reported out to the floor later this week. Senator McFarland has proposed an amendment to the bill which would limit it to a year and would apply to only the first 400,000 tons of copper to be imported. The trade is uncertain as to how this provision could be put into force. It would seem to be an unnecessary restriction in as much as imports have been running about 300,000 tons per year.

It is quite likely that the McFarland amendment may not be included when the bill is reported out of committee, especially in view of the time that would be required for consideration by the Conference Committee of the two Houses. Considerable pressure has been exercised on Congress by copper consumers to get the tariff suspension measure passed as expeditiously as possible in view of the acute shortage. If a conference should decide to split the difference in time and make the period 18 months, it is quite probable that Congress might not be in session at the proper time to consider an extension of time if necessary.

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Aluminum

• • • **The order backlogs** on all aluminum fabricated products, which were sizable up to two months ago, have been reduced appreciably in recent weeks. One producer is currently accepting orders for June delivery of sheets. Extrusions are available on seven weeks' delivery; tubing, eight weeks. There are substantial stocks of wire, rod and bar stocks which are available for immediate delivery.

In atempting to determine the cause of the significant change represented by this order picture, market analysts have concluded that aluminum customers have built up their inventories based on 1946 rates of production and demand. Now they find that they are unable to market all their production at former high rates and have cancelled some earlier orders. Moreover, in view of the length of time previously required for delivery, commitments were made for fabricated products well in advance of actual need. Cancellations have made room for earlier delivery of other orders.

There have been no recent price changes made in aluminum products.

•

Nickel Oxide Output Stops

New York

• • • **The Nicaro Nickel** Co., subsidiary of the Freeport Sulphur Co., will discontinue on Mar. 31 the production and sale of nickel oxide recovered from Cuban ores at the RFC plant it operated during the war. Negotiations with government agencies for the acquisition of the plant have been under way for some time and it had been expected that the recent increase in the price of nickel might serve as the basis for agreement on disposition of the plant. Operations had previously been scheduled to end on Jan. 31. The parent company had also operated properties of the Cuban American Manganese Co. whose operations were liquidated on Dec. 31.

•

Zinc

• • • **Shortage of zinc** is still acute particularly in Prime Western and Special High Grade. There are no imports of zinc reported to be coming into the country except some ore and concentrates which have been coming in from Mexico and Canada. Consumers of zinc are not happy over the difficulty in securing their requirements but there seems to be no prospect of bettering the supply position until demand tends to decline.

J&L Buys Tinplate Lines

Washington

• • • **The RFC has confirmed** the sale of two electrolytic tinplate lines at Aliquippa, Pa., which were built by the government for war production at a cost of $2.8 million. Sale was to the lessee, Jones & Laughlin Steel Corp., which paid $1.2 million for the facilities.

Nonferrous Metals Prices

Cents per pound

	Mar. 19	Mar. 20	Mar. 21	Mar. 22	Mar. 24	Mar. 25
Copper, electro, Conn.	21.50	21.50	21.50	21.50	21.50	21.50
Copper, Lake, Conn.	21.625	21.625	21.625	21.625	21.625	21.625
Tin, Straits, New York	70.00	70.00	70.00	....	70.00	70.00
Zinc, East St. Louis	10.50	10.50	10.50	10.50	10.50	10.50
Lead, St. Louis	14.80	14.80	14.80	14.80	14.80	14.80

Primary Metals

(Cents per lb, unless otherwise noted)

Aluminum, 99+%, f.o.b. shipping point (min. 10,000 lb) 15.00
Aluminum pig, f.o.b. shipping point 14.00
Antimony, American Laredo Tex.. 33.00
Beryllium copper, 3.75-4.25% Be; dollars per lb contained Be.....$14.75
Beryllium aluminum, 5% Be; dollars per lb contained Be $27.50
Cadmium, del'd $1.75
Cobalt, 97-99% (per lb)....$1.50 to $1.57
Copper, electro, Conn. Valley..... 21.50
Copper, lake, Conn. Valley 21.625
Gold, U. S. Treas., dollars per oz.. $35.00
Indium, 99.8%, dollars per troy oz. $2.25
Iridium, dollars per troy oz.....$110.00
Lead, St. Louis 14.80
Lead, New York 15.00
Magnesium, 99.8+% 20.50
Magnesium, sticks, carlots 36.00
Mercury, dollars per 76-lb flask, f.o.b. New York .....$88 to $90
Nickel, electro, f.o.b. New York.... 37.67
Palladium, dollars per troy oz....$24.00
Platinum, dollars per troy oz..$58 to $61
Silver, New York, cents per oz.... 77.25
Tin, Straits, New York 70.00
Zinc, East St. Louis 10.50
Zinc, New York 11.005
Zirconium copper, 6 pct Zr, per lb contained Zr $8.75

Remelted Metals

Brass Ingot

(Cents per lb, in carloads)

85-5-5-5 ingot
No. 115 ..... 21.50
No. 120 ..... 21.00
No. 123 ..... 20.50
80-10-10 ingot
No. 305 ..... 24.50
No. 315 ..... 23.00
88-10-2 ingot
No. 210 ..... 27.25
No. 215 ..... 26.25
No. 245 ..... 23.50
Yellow ingot
No. 405 ..... 17.00
Manganese Bronze
No. 421 ..... 19.25

Aluminum Ingot

(Cents per lb, lots of 30,000 lb)

95-5 aluminum-silicon alloys:
0.30 copper max. ..... 17.75—18.00
0.60 copper, max. ..... 17.50—17.75
Piston alloys (No. 122 type) 16.25—16.50
No. 12 alum. (No. 2 grade). 15.50—15.75
108 alloy ..... 15.75—16.00
195 alloy ..... 16.25—16.50
AXS-679 ..... 15.75—16.00
Steel deoxidizing aluminum, notch-bar, granulated or shot
Grade 1—95 pct-97½ pct .. 16.75—17.00
Grade 2—92 pct-95 pct .... 15.75—16.00
Grade 3—90 pct-92 pct .... 15.25—15.50
Grade 4—85 pct-90 pct .... 14.75—15.00

Electroplating Supplies

Anodes

(Cents per lb, f.o.b. shipping point in 500 lb lots)

Copper, frt. allowed
Cast, oval, 15 in. or longer..... 36⅞
Electrodeposited 31⅝
Rolled, oval, straight, delivered.. 32⅛
Brass, 80-20, frt allowed
Cast, oval, 15 in. or longer 33
Zinc, Cast, 99.99 ..... 18¾
Nickel, 99 pct plus, frt allowed
Cast 51
Rolled, depolarized 52
Silver, 999 fine
Rolled, 1000 oz lots, per oz. 88¼

Chemicals

(Cents per lb, f.o.b. shipping point)

Copper cyanide, 100 lb drum 40.50
Copper sulphate, 99.5, crystals, bbls 11.50
Nickel salts, single, 425 lb bbls, frt allowed 14.50
Silver cyanide, 100 oz. lots, per oz 70⅞
Sodium cyanide, 96 pct, domestic, 200 lb drums 15.00
Zinc cyanide, 100 lb drums..... 34.00
Zinc, sulphate, 89 pct, crystals, bbls, frt allowed 7.75

Mill Products

Aluminum

(Cents per lb, base, subject to extras for quantity, gage, size, temper and finish)

Drawn tubing: 2 to 3 in. OD by 0.065 in. wall: 3S, 43.5¢; 52S-O, 67¢; 24S-T, 71¢; base, 30,000 lb.

Plate: ¼ in. and heavier; 2S, 3S, 21.2¢; 52S, 24.2¢ 61S, 23.8¢; 24S, 24S-AL, 24.2¢; 75S, 75S-AL, 30.5¢; base, 30,000 lb.

Flat Sheet: 0.136-in. thickness: 2S, 3S, 23.7¢; 52S, 27.2¢; 61S, 24.7¢; 24S-O, 24S-OAL, 26.7¢; 75S-O, 75S-OAL, 32.7¢; base, 30,000 lb.

Extruded Solid Shapes: factor determined by dividing the perimeter of the shape by its weight per foot. For factor 1 through 4, 3S, 26¢; 14S, 32.5¢; 24S, 35¢; 53S, 61S, 28¢; 63S, 27¢; 75S, 45.5¢; base, 30,000 lb.

Wire, Rod and Bar: screw machine stock, rounds, 17S-T, ¼ in., 29.5¢; ½ in., 37.5¢; 1 in., 26¢; 2 in., 24.5¢; hexagons, ¼ in., 35.5¢; ½ in., 30¢; 1 in., 2 in., 27¢; base, 5000 lb. *Rod:* 2S, 3S, 1¼ to 2½ in. diam, rolled, 23¢; cold-finished, 23.5¢ base, 30,000 lb. *Round Wire:* drawn, coiled, B & S gage 17-18; 2S, 3S, 33.5¢; 56S, 39.5¢; 10,000 lb base. B & S gage 00-1: 2S, 3S, 21¢; 56S, 30.5¢. B & S 15-16; 2S, 3S, 32.5¢; 56S, 38¢; base, 30,000 lb.

Magnesium

(Cents per lb. f.o.b. mill)

Sheet and Plate: Ma. FSa. ¼ in., 54¢-56¢; 0.188 in., 56¢-58¢; B & S gage 3, 58¢-60¢; 10, 59¢-61¢; 14, 69¢-74¢; 16, 79¢-81¢; 18, 87¢-89¢; 22, $1.25-$1.31; 24, $1.71-$1.75. Base quantity 30,000 lb.

Round Rod: M, diam in. ⅛, 55¢; ¼, 47¢ ⅜, 46¢; ½, 45¢; ¾, 44¢; 1¾, 43.5¢; 2, 42.5¢; 3, 41.5¢; 4, 42.5¢ 5, 43.5¢; 6 & 7 in., 44¢. Base price, 5000-10,000 lb.

Square and Hexagonal Bar: M, diam in. ⅛, 58¢; ¼, 50¢; ⅜, 48¢; ½, 47.5¢; ¾, 46.5¢; 1¾, 45.5¢; 2, 44.5¢; 3, 43.5¢; 4 & 5 in. 44.5¢; 6 & 7 in., 45¢. Base quantity, 5000-10,000 lb.

Tubing: Varies with wall thickness and outside diameter.

Nickel and Monel

(Cents per lb, f.o.b. mill)

	Nickel	Monel
Sheets, cold-rolled	54	43
No. 35 sheets	..	41
Strip, cold-rolled	60	44
Rod		
Hot-rolled	50	39
Cold-drawn	55	44
Angles, hot-rolled	50	39
Plates	52	41
Seamless tubes	83	71
Shot and blocks	..	31

Zinc

(Cents per lb, f.o.b. mill)

Sheet, l.c.l. 15.50
Ribbon, ton lots 14.50
Plates
Small 13.50
Large, over 12 in. 14.50

Copper, Brass, Bronze

(Cents per lb)

	Extruded Shapes	Rods	Sheets
Copper	32.78	....	32.93
Copper, hot rolled.	....	29.28	....
Copper, drawn....	....	30.28	....
Low brass	39.13	30.32	30.63
High brass	37.38	28.57	28.88
Red brass	39.74	30.93	31.24
Naval brass	28.73	27.48	33.42
Brass, free cutting	27.23	23.64	....
Commercial bronze	40.86	32.05	32.36
Manganese bronze	32.23	30.78	36.92
Phosphor bronze, 5 pct.	....	51.00	50.75
Muntz metal	28.42	27.17	31.61
Everdur, Herculoy Olympic, etc.	36.30	36.65	37.71
Nickel silver, 5 pct.	40.54	39.53	37.92
Architectural bronze	27.23	....	....

Scrap Metals

(Dealers' buying prices, f.o.b. New York in cents per pound.)

Brass Mill Scrap

(Lots of less than 15,000 lb.)

Cartridge brass turnings 14¼
Loose yellow brass trimmings..... 15⅛

Copper and Brass

No. 1 heavy copper and wire 16½—17
No. 2 heavy copper and wire 15½—16
Light copper ..... 14½—15
Auto radiators (unsweated) 10¾—11¼
No. 1 composition ..... 14¼—15
No. 1 composition turnings.. 13¼—14
Clean red car boxes ..... 12 —12½
Cocks and faucets ..... 11¼—11¾
Mixed heavy yellow brass.... 9¾—10¼
Old rolled brass ..... 9½—10
Brass pipe ..... 11½—11¾
New soft brass clippings.... 13 —13½
Brass rod ends ..... 12½—12¾
No. 1 brass rod turnings.... 12 —12½

Aluminum

Alum. pistons with struts .... 4½—5
Aluminum crankcases ..... 6¾—7
2S aluminum clippings ..... 8¼—8½
Old sheet & utensils ..... 6¾—7
Mixed borings and turnings... 2½—3
Misc. cast aluminum ..... 6¼—6¾
Dural clips (24S) ..... 5¾—6

Zinc

New zinc clippings ..... 7 — 7⅛
Old zinc ..... 5¼ — 5¾
Zinc routings ..... 3 — 3⅛
Old die cast scrap ..... 3 — 3¼

Nickel and Monel

Pure nickel clippings .....22 —23
Clean nickel turnings .....17 —18
Nickel anodes .....19½—20½
Nickel rod ends .....20 —21
New Monel clippings .....14 —15
Clean Monel turnings ..... 9 —10
Old sheet Monel .....12 —12½
Old Monel castings .....10 —11
Inconel clippings .....10 —11
German silver clippings, mixed10½—11
German silver turnings, mixed 7 — 7¼

Lead

Soft scrap lead ..... 12 —12½
Battery plates (dry) ..... 7 — 7½

Miscellaneous

Block tin 60
No. 1 pewter .....46 —48
No. 1 auto babbitt .....35 —36
Mixed common babbitt .....12 —12½
Solder joints .....13½—13⅝
Siphon tops .....38 —39
Small foundry type .....15 —15½
Monotype ..... 13½—14
Lino and stereotype ..... 12 —13
Electrotype ..... 11 —12
New type shell cuttings (nom) 13 —13½
Clean hand picked type shells. 5½— 6
Lino and stereo dross ..... 6 — 6½
Electro dross ..... 4 — 4½

Lead Products

(Cents per lb)

F.o.b. shipping point freight collect. Freight equalized with nearest free delivery point.

Full lead sheets 18.25
Cut lead sheets 18.75
Lead pipe, manufacturing point... 17.50
Lead traps and bends .....List +42%
Combination lead and iron bends and ferrules, also combination lead and iron ferrules ....List +42%
Lead wool 19.50

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There have been no recent price changes made in aluminum products.

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Nickel Oxide Output Stops

New York

• • • **The Nicaro Nickel** Co., subsidiary of the Freeport Sulphur Co., will discontinue on Mar. 31 the production and sale of nickel oxide recovered from Cuban ores at the RFC plant it operated during the war. Negotiations with government agencies for the acquisition of the plant have been under way for some time and it had been expected that the recent increase in the price of nickel might serve as the basis for agreement on disposition of the plant. Operations had previously been scheduled to end on Jan. 31. The parent company had also operated properties of the Cuban American Manganese Co. whose operations were liquidated on Dec. 31.

•

Zinc

• • • **Shortage of zinc** is still acute particularly in Prime Western and Special High Grade. There are no imports of zinc reported to be coming into the country except some ore and concentrates which have been coming in from Mexico and Canada. Consumers of zinc are not happy over the difficulty in securing their requirements but there seems to be no prospect of bettering the supply position until demand tends to decline.

J&L Buys Tinplate Lines

Washington

• • • **The RFC has confirmed** the sale of two electrolytic tinplate lines at Aliquippa, Pa., which were built by the government for war production at a cost of $2.8 million. Sale was to the lessee, Jones & Laughlin Steel Corp., which paid $1.2 million for the facilities.

Nonferrous Metals Prices

Cents per pound

	Mar. 19	Mar. 20	Mar. 21	Mar. 22	Mar. 24	Mar. 25
Copper, electro, Conn.	21.50	21.50	21.50	21.50	21.50	21.50
Copper, Lake, Conn.	21.625	21.625	21.625	21.625	21.625	21.625
Tin, Straits, New York	70.00	70.00	70.00	....	70.00	70.00
Zinc, East St. Louis	10.50	10.50	10.50	10.50	10.50	10.50
Lead, St. Louis	14.80	14.80	14.80	14.80	14.80	14.80

Primary Metals

(Cents per lb, unless otherwise noted)

Aluminum, 99+%, f.o.b. shipping point (min. 10,000 lb)	15.00
Aluminum pig, f.o.b. shipping point	14.00
Antimony, American Laredo Tex...	33.00
Beryllium copper, 3.75-4.25% Be; dollars per lb contained Be	$14.75
Beryllium aluminum, 5% Be; dollars per lb contained Be	$27.50
Cadmium, del'd	$1.75
Cobalt, 97-98% (per lb)	$1.50 to $1.57
Copper, electro, Conn. Valley	21.50
Copper, lake, Conn. Valley	21.625
Gold, U. S. Treas., dollars per oz.	$35.00
Indium, 99.8%, dollars per troy oz.	$2.25
Iridium, dollars per troy oz.	$110.00
Lead, St. Louis	14.80
Lead, New York	15.00
Magnesium, 99.8+%	20.50
Magnesium, sticks, carlots	36.00
Mercury, dollars per 76-lb flask, f.o.b. New York	$88 to $90
Nickel, electro, f.o.b. New York	37.67
Palladium, dollars per troy oz.	$24.00
Platinum, dollars per troy oz.	$58 to $61
Silver, New York, cents per oz.	77.25
Tin, Straits, New York	70.00
Zinc, East St. Louis	10.50
Zinc, New York	11.005
Zirconium copper, 6 pct Zr, per lb contained Zr	$8.75

Remelted Metals

Brass Ingot

(Cents per lb, in carloads)

85-5-5-5 ingot	
No. 115	21.50
No. 120	21.00
No. 123	20.50
80-10-10 ingot	
No. 305	24.50
No. 315	23.00
88-10-2 ingot	
No. 210	27.25
No. 215	26.25
No. 245	23.50
Yellow ingot	
No. 405	17.00
Manganese Bronze	
No. 421	19.25

Aluminum Ingot

(Cents per lb, lots of 30,000 lb)

95-5 aluminum-silicon alloys;	
0.30 copper max.	17.75—18.00
0.60 copper, max.	17.50—17.75
Piston alloys (No. 122 type)	16.25—16.50
No. 12 alum. (No. 2 grade)	15.50—15.75
108 alloy	15.75—16.00
195 alloy	16.25—16.50
AXS-679	15.75—16.00
Steel deoxidizing aluminium, notch-bar, granulated or shot	
Grade 1—95 pct-97½ pct	16.75—17.00
Grade 2—92 pct-95 pct	15.75—16.00
Grade 3—90 pct-92 pct	15.25—15.50
Grade 4—85 pct-90 pct	14.75—15.00

Electroplating Supplies

Anodes

(Cents per lb, f.o.b. shipping point in 500 lb lots)

Copper, frt. allowed	
Cast, oval, 15 in. or longer	36⅞
Electrodeposited	31⅝
Rolled, oval, straight, delivered	32⅛
Brass, 80-20, frt allowed	
Cast, oval, 15 in. or longer	33
Zinc, Cast, 99.99	18¾
Nickel, 99 pct plus, frt allowed	
Cast	51
Rolled, depolarized	52
Silver, 999 fine	
Rolled, 1000 oz lots, per oz.	88¼

Chemicals

(Cents per lb, f.o.b. shipping point)

Copper cyanide, 100 lb drum	40.50
Copper sulphate, 99.5, crystals, bbls	11.50
Nickel salts, single, 425 lb bbls, frt allowed	14.50
Silver cyanide, 100 oz. lots, per oz	70⅞
Sodium cyanide, 96 pct, domestic, 200 lb drums	15.00
Zinc cyanide, 100 lb drums	34.00
Zinc, sulphate, 89 pct, crystals, bbls, frt allowed	7.75

Mill Products

Aluminum

(Cents per lb, base, subject to extras for quantity, gage, size, temper and finish)

Drawn tubing: 2 to 3 in. OD by 0.065 in. wall: 3S, 43.5¢; 52S-O, 67¢; 24S-T, 71¢; base, 30,000 lb.

Plate: ¼ in. and heavier; 2S, 3S, 21.2¢; 52S, 24.2¢ 61S, 23.3¢; 24S, 24S-AL, 24.2¢; 75S, 75S-AL, 30.5¢; base, 30,000 lb.

Flat Sheet: 0.136-in. thickness: 2S, 3S, 23.7¢; 52S, 27.2¢; 61S, 24.7¢; 24S-O, 24S-OAL, 26.7¢; 75S-O, 75S-OAL, 32.7¢; base, 30,000 lb.

Extruded Solid Shapes: factor determined by dividing the perimeter of the shape by its weight per foot. For factor 1 through 4, 3S, 26¢; 14S, 32.5¢; 24S, 35¢; 53S, 61S, 28¢; 63S, 27¢; 75S, 45.5¢; base, 30,000 lb.

Wire, Rod and Bar: screw machine stock, rounds, 17S-T, ¼ in., 29.5¢; ½ in., 37.5¢; 1 in., 26¢; 2 in., 24.5¢; hexagons, ¼ in., 35.5¢; ½ in., 30¢; 1 in., 2 in., 27¢; base, 5000 lb. *Rod:* 2S, 3S, 1¼ to 2½ in. diam, rolled, 23¢; cold-finished, 23.5¢ base, 30,000 lb. *Round Wire:* drawn, coiled, B & S gage 17-18; 2S, 3S, 33.5¢; 56S, 39.5¢; 10,000 lb base. B & S gage 00-1: 2S, 3S, 21¢; 56S, 30.5¢. B & S 15-16; 2S, 3S, 32.5¢; 56S, 38¢; base, 30,000 lb.

Magnesium

(Cents per lb. f.o.b. mill)

Sheet and Plate: Ma. FSa. ¼ in., 54¢-56¢; 0.188 in., 56¢-58¢; B & S gage 8, 58¢-60¢; 10, 59¢-61¢; 14, 69¢-74¢; 16, 79¢-81¢; 18, 87¢-89¢; 22, $1.25-$1.31; 24, $1.71-$1.75. Base quantity 30,000 lb.

Round Rod: M, diam in. ⅛, 55¢; ¼, 47¢ ⅜, 46¢; ½, 45¢; ¾, 44¢; 1¾, 43.5¢; 2, 42.5¢; 3, 41.5¢; 4, 42.5¢ 5, 43.5¢; 6 & 7 in., 44¢. Base price, 5000-10,000 lb.

Square and Hexagonal Bar: M, diam in. ⅛, 58¢; ¼, 50¢; ⅜, 48¢; ½, 47.5¢; ¾, 46.5¢; 1¾, 45.5¢; 2, 44.5¢; 3, 43.5¢; 4 & 5 in. 44.5¢; 6 & 7 in., 45¢. Base quantity, 5000-10,000 lb.

Tubing: Varies with wall thickness and outside diameter.

Nickel and Monel

(Cents per lb, f.o.b. mill)

	Nickel	Monel
Sheets, cold-rolled	54	43
No. 35 sheets	..	41
Strip, cold-rolled	60	44
Rod		
Hot-rolled	50	39
Cold-drawn	55	44
Angles, hot-rolled	50	39
Plates	52	41
Seamless tubes	83	71
Shot and blocks	..	31

Zinc

(Cents per lb, f.o.b. mill)

Sheet, l.c.l.	15.50
Ribbon, ton lots	14.50
Plates	
Small	13.50
Large, over 12 in.	14.50

Copper, Brass, Bronze

(Cents per lb)

	Extruded Shapes	Rods	Sheets
Copper	32.78	....	32.93
Copper, hot rolled	....	29.28	....
Copper, drawn	....	30.28	....
Low brass	39.13	30.32	30.63
High brass	37.38	28.57	28.88
Red brass	39.74	30.93	31.24
Naval brass	28.73	27.48	33.42
Brass, free cutting	27.23	23.64	....
Commercial bronze	40.86	32.05	32.36
Manganese bronze	32.28	30.78	36.92
Phosphor bronze, 5 pct.	....	51.00	50.75
Muntz metal	28.42	27.17	31.61
Everdur, Herculoy			
Olympic, etc.	36.30	36.65	37.71
Nickel silver, 5 pct.	40.54	39.53	37.92
Architectural bronze	27.23	....	....

Scrap Metals

(Dealers' buying prices, f.o.b. New York in cents per pound.)

Brass Mill Scrap

(Lots of less than 15,000 lb.)

Cartridge brass turnings	14¼
Loose yellow brass trimmings	15⅛

Copper and Brass

No. 1 heavy copper and wire	16½—17
No. 2 heavy copper and wire	15½—16
Light copper	14½—15
Auto radiators (unsweated)	10¾—11¼
No. 1 composition	14¼—15
No. 1 composition turnings	13¼—14
Clean red car boxes	12 —12½
Cocks and faucets	11¼—11¾
Mixed heavy yellow brass	9¾—10¼
Old rolled brass	9½—10
Brass pipe	11½—11¾
New soft brass clippings	13 —13½
Brass rod ends	12½—12¾
No. 1 brass rod turnings	12 —12½

Aluminum

Alum. pistons with struts	4½—5
Aluminum crankcases	6¾—7
2S aluminum clippings	8¼—8½
Old sheet & utensils	6¾—7
Mixed borings and turnings	2½—3
Misc. cast aluminum	6¼—6¾
Dural clips (24S)	5¾—6

Zinc

New zinc clippings	7 — 7½
Old zinc	5¼— 5¾
Zinc routings	3 — 3⅛
Old die cast scrap	3 — 3¼

Nickel and Monel

Pure nickel clippings	22 —23
Clean nickel turnings	17 —18
Nickel anodes	19½—20½
Nickel rod ends	20 —21
New Monel clippings	14 —15
Clean Monel turnings	9 —10
Old sheet Monel	12 —12½
Old Monel castings	10 —11
Inconel clippings	10 —11
German silver clippings, mixed	10½—11
German silver turnings, mixed	7 — 7¼

Lead

Soft scrap lead	12 —12½
Battery plates (dry)	7 — 7½

Miscellaneous

Block tin	60
No. 1 pewter	46 —48
No. 1 auto babbitt	35 —36
Mixed common babbitt	12 —12½
Solder joints	13¼—13¾
Siphon tops	38 —39
Small foundry type	15 —15½
Monotype	13½—14
Lino and stereotype	12 —13
Electrotype	11 —12
New type shell cuttings (nom)	13 —13½
Clean hand picked type shells	5½— 6
Lino and stereo dross	6 — 6½
Electro dross	4 — 4½

Lead Products

(Cents per lb)

F.o.b. shipping point freight collect. Freight equalized with nearest free delivery point.

Full lead sheets	18.25
Cut lead sheets	18.75
Lead pipe, manufacturing point	17.50
Lead traps and bends	List +42%
Combination lead and iron bends and ferrules, also combination lead and iron ferrules	List +42%
Lead wool	19.50

SCRAP

Price Softness Appears in Some Markets

New York

• • • **There were signs this week of a softening in steel scrap prices. Weakness was apparent in the broker's markets at New York and Boston, while in Cleveland and the Valley mill prices offered for material coming from outside the district declined $1. But early in the week talk of lower prices had not affected quotations at most major consuming centers, notably in Pittsburgh and Chicago, although Philadelphia steel grades dropped 50¢.**

In Chicago, a major mill stated late last week that no further "springboard" prices will be paid there. The decision had not, however, been in effect long enough to weigh its effect on Chicago prices.

Whether scrap price weakness will dry up or spread may be debatable. Some market observers call it a case of jitters brought on by customer resistance backed by some withdrawals from the market. But others anticipate general scrap price declines throughout the country. One thing was clear this week: For the first time in months the upward scrap price spiral had halted and some declines were posted. A broker's offer to ship a good tonnage to a mill at current prices on a 60-day contract was rejected.

•

PITTSBURGH—A game of blind man's buff is going on in this district with consumers quietly "testing" the market to see if there is any real weakness in the price. Up to now, no tangible local weaknesses have been apparent. The present fluctuations of the scrap market may be just a jockeying for workable differentials between grades and between areas, with the general price pattern continuing to remain at current high levels. Despite the fluctuations of price in the eastern markets, no change has occurred here. However, if eastern prices continue to ease throughout this week, there may be a decrease in the upper range of the quotations for Pittsburgh. As to direct Pittsburgh market prices (the lower part of the range) there is no anticipated change. Low phos, selling locally for $44 to $45, will likely be the first grade affected locally by the price declines, only because the price is out of line with the prices of other grades. The increase in the railroad specialty prices is the result of a recent railroad scrap sale.

•

CHICAGO—Dealers at the moment are much more interested in shipping scrap to the mills at the going price than securing new orders. Scrap from outlying areas continued to arrive here last week with $41.50 per gross ton delivered as the highest figure paid. A few smaller mills outside the immediate area are out of the market. If these mills, which have remained competitive on prices for outlying material, remain dormant the prices for out of district scrap could ease in the next few weeks. One large consumer is planning to discontinue all springboard prices into this area.

•

PHILADELPHIA—It appears that the market has reached a peak here with steel grades 50¢ per ton. Mills are reported to be holding back on purchases and dealers are said to be nervously seeking broker purchases in contrast to their former seller's market viewpoint. Any future trend toward a declining market should be encouraged by the coming spring weather and seasonally larger scrap volume. However, at current ingot rates, most mills cannot remain out of the market long in the hope of lower prices. Heavy axle forge turnings were quoted in error in last week's issue; the correct figure was $40.00 to $41.50.

•

NEW YORK—Brokers here are almost unanimous in their opinion that prices are at the turning point and some weakness was apparent here early this week. While some purchases of heavy melting at $37 were reported, others were negotiated at $36, down $1. A spread and some weakness in turnings also appeared. Cast iron was still firm though high pig iron production is seen in some circles as a possible tendency to future weakness in these grades. Dealer collections in this area have been unusually good in the past few weeks.

•

DETROIT—With industrial operations continuing at peak post-war levels, and the flow of country and yard prepared scrap perceptibly improved, the tendency has been for the Detroit market to soften somewhat although there are no indications that this new situation is yet reflected in scrap prices, which remain the same as the previous week. Both steel and foundry grades are said to be easier. It is reported that some Detroit buyers have been able to lay up some scrap in recent weeks and major purchasers appear to be buying on a day-to-day basis when they are in the market for additional scrap.

•

CLEVELAND—Heavy shipments and weakening prices for remote material have had the market here buzzing with rumors of a major price break. Local markets are holding firm, however, and the only change thus far has been in the fancy prices which some consumers have been paying for material from distant areas. Shipments are very good, and some dealers are limited only by their ability to get cars. Token resistance to No. 1 at $38 has been reported in the Valley, but brokers paid $42.86 for unprepared No. 1 at Marion, Ohio, last week, where 25,000 tons were parceled out to the trade. One major consumer in the valley is still embargoed.

•

BOSTON—Early this week with buying at a standstill the market here was weaker but brokers felt it would be midweek before it had been established. While former quotations are nominally steady, guesses on the probable drop range from $1 to $3 a ton lower. The turning point came when one mill came into the market for turnings, paying $30 for machine shop and $31 for shoveling. After buying a few hundred tons it withdrew from the market and talk filtered into trade circles of a break in prices.

•

BUFFALO—The extreme foolishness that had gripped the local market for the last several months was gone this week and prices appeared to have levelled off. Evidence of the change was to be found in reports that short offerings for delivery in 30 to 60 days were being turned down by mills. Quotations in other parts of the list were revised to conform to the higher prices for open-hearth grades, but steel foundries were refusing to buy rail specialties at advances of $2 to $3 a ton.

•

CINCINNATI—A definite price resistance became apparent in this market toward the latter part of the week. At that time consumers in the area stated that they would definitely take no steel at all unless there was a reduction of $2. What the effect of this attitude may be is not definitely known, but there is feeling that prices, while remaining unchanged now, may succumb to the present resistance. The view is expressed that many plants have sufficient inventories on hand to carry them for some time, so that they are now taking a position of resistance to high prices.

•

ST. LOUIS—Demand for malleable scrap iron from outside markets plus the scarcity of the item caused an advance of $5 a ton in the St. Louis market. Steel mills are accepting melting grades at present levels, but are refusing to pay any more, which has halted the advance of these items for the present.

•

BIRMINGHAM—Although scrap prices in this area remain firm, there is a feeling of softness in the market and no sales for long range deliveries are being made. Pressure for material moving out of this district for northern and eastern mills has eased somewhat. Movement of scrap to both local and out of district consumers is very heavy on earlier purchases.

•

TORONTO—Little change was noted in conditions in the scrap iron and steel markets in the past week or 10 days. Local dealers state there has been some minor improvement in receipts, but supplies on hand are less than 10 pct. of consumer's current needs. Adverse transportation conditions continue to retard scrap deliveries from outside points and most of the scrap appearing on the market is from industrial plants and supply from this source is only about 25 pct. of normal.

IRON AND STEEL SCRAP PRICES

PITTSBURGH

Per gross ton delivered to consumer:†

No. 1 hvy. melting	$38.00 to $44.00
RR. hvy. melting	37.50 to 38.00
No. 2 hvy. melting	38.00 to 44.00
RR. scrap rails	43.00 to 44.00
Rails 2 ft. and under	47.00 to 48.00
No. 1 comp'd bundles	38.00 to 44.00
Hand bdld. new shts.	38.00 to 44.00
Hvy. axle turn.	37.00 to 37.50
Hvy. steel forge turn.	37.00 to 37.50
Mach. shop turn.	33.00 to 34.00
Short. shov. turn.	34.00 to 35.00
Mixed bor. and turn.	33.00 to 34.00
Cast iron borings	33.00 to 34.00
No. 1 cupola cast	44.00 to 45.00
Heavy breakable cast	38.00 to 39.00
Malleable	44.00 to 45.00
RR. knuck. and coup.	47.00 to 48.00
RR. coil springs	47.00 to 48.00
Rail leaf springs	47.00 to 48.00
Rolled steel wheels	47.00 to 48.00
Low phos.	44.00 to 45.00

CHICAGO

Per gross ton delivered to consumer:†

No. 1 hvy. melting	$35.50 to $39.00
No. 2 hvy. melting	35.50 to 39.00
No. 1 bundles	35.50 to 39.00
No. 2 dealers' bundles	35.50 to 39.00
Bundled mach. shop turn	35.50 to 39.00
Galv. bundles	33.50 to 34.00
Mach. shop turn.	30.50 to 31.00
Short shov. turn.	32.50 to 33.00
Cast iron borings	31.50 to 32.00
Mix. borings & turn.	30.50 to 31.00
Los. phos. hvy. forge	40.00 to 41.50
Low phos. plates	38.50 to 42.50
No. 1 RR. hvy. melt.	36.50 to 37.00
Rerolling rails	45.25 to 46.00
Miscellaneous rails	43.00 to 44.00
Angles & splice bars	45.00 to 47.75
Locomotive tires, cut	42.00 to 45.00
Cut bolster & side frames	39.00 to 40.00
Standard stl. car axles	43.00 to 44.00
No. 3 steel wheels	41.00 to 43.00
Couplers & knuckles	43.50 to 45.00
Malleable	48.00 to 49.00
No. 1 mach. cast	46.00 to 47.00
Rails 2 ft. and under	49.00 to 50.00
No. 1 agricul. cast	38.50 to 39.00
Hvy. breakable cast	37.50 to 38.00
RR. grate bars	40.50 to 41.00
Cast iron brake shoes	40.00 to 42.00
Stove plate	41.00 to 42.00
Cast iron carwheels	42.00 to 43.00

CINCINNATI

Per gross ton delivered to consumer:†

No. 1 hvy. melting	$36.00 to $38.00
No. 2 hvy. melting	36.00 to 38.00
No. 1 bundles	36.00 to 38.00
No. 2 bundles	36.00 to 38.00
Mach. shop turn.	30.00 to 31.00
Shoveling turn.	30.00 to 32.00
Cast iron borings	29.00 to 31.00
Mixed bor. & turn.	29.00 to 31.00
Low phos. plate	40.00 to 42.00
No. 1 cupola cast	49.00 to 50.00
Hvy. breakable cast	35.00 to 36.00
Stove plate	31.00 to 32.00
Scrap rails	40.00 to 41.00

BOSTON

Dealers' buying prices per gross ton, f.o.b. cars

No. 1 hvy. melting	....	$36.00
No. 2 hvy. melting	....	36.00
Nos. 1 and 2 bundles	....	36.00
Busheling	....	36.00
Turnings, shovelings	$28.50 to	29.00
Machine shop turn.	....	27.00
Mixed bor. & turn.	....	27.00
Cl'n cast. chem. bor.	28.50 to	29.00
No. 1 machinery cast	40.00 to	45.00
No. 2 machinery cast	40.00 to	45.00
Heavy breakable cast	40.00 to	45.00
Stove plate	40.00 to	45.00

DETROIT

Per gross, ton, brokers' buying prices, f.o.b. cars:

No. 1 hvy. melting	$34.75 to $35.25
No. 2 hvy. melting	34.75 to 35.25
No. 1 bundles	34.75 to 35.25
New busheling	34.75 to 35.25
Flashings	34.75 to 35.25
Mach. shop turn.	28.00 to 28.50
Short shov. turn.	28.00 to 28.50
Cast iron borings	28.00 to 28.50
Mixed bor. & turn.	28.00 to 28.50
Low phos. plate	36.75 to 37.25
No. 1 cupola cast	41.25 to 45.25
Hvy. breakable cast	37.25 to 39.25
Stove plate	37.25 to 39.25
Automotive cast	48.50 to 50.00

PHILADELPHIA

Per gross ton delivered to consumer:†

No. 1 hvy. melting	$39.50 to $41.00
No. 2 hvy. melting	39.50 to 41.00
No. 1 bundles	39.50 to 41.00
No. 2 bundles	39.50 to 41.00
Mach. shop turn.	28.50 to 29.50
Shoveling turn.	29.50 to 30.50
Mixed bor. & turn.	28.50 to 29.50
Clean cast chemical bor.	34.50 to 35.50
No. 1 cupola cast	49.00 to 51.00
Hvy. breakable cast	46.00 to 48.00
Cast. charging box	46.00 to 48.00
Clean auto cast	49.00 to 51.00
Hvy. axle forge turn.	39.50 to 41.00
Low phos. plate	44.50 to 45.50
Low phos. punchings	44.50 to 45.50
Low phos. bundles	43.50 to 44.50
RR. steel wheels	44.50 to 45.50
RR. coil springs	44.50 to 45.50
RR. malleable	49.00 to 51.00

Going prices as obtained in the trade by THE IRON AGE, based on representative tonnages. Where substantial tonnages of open hearth grades come into a consuming district from outside of that district, the upper range of the price quoted here is the representative average delivered price of the bulk of this incoming material; the lower range shows the price being paid for scrap originating within the consuming district.

ST. LOUIS

Per gross ton delivered to consumer:†

No. 1 hvy. melting	$35.50 to $36.50
Bundled sheets	35.50 to 36.50
Mach. shop turn.	30.00 to 31.00
Locomotive tires, uncut	37.00 to 38.00
Mis. std. sec. rails	40.00 to 42.00
Rerolling rails	42.00 to 44.00
Steel angle bars	40.00 to 41.00
Rails 3 ft. and under	42.00 to 44.00
RR. steel springs	40.00 to 41.00
Steel car axles	38.00 to 40.00
Stove plate	36.00 to 38.00
Grate bars	35.00 to 36.00
Brake shoes	35.00 to 36.00
Malleable	48.00 to 50.00
Cast iron car wheels	40.00 to 41.00
No. 1 machinery cast	40.00 to 41.00
Breakable cast	37.00 to 38.00

BIRMINGHAM

Per gross ton delivered to consumer:†

No. 1 hvy. melting	....	$36.00
No. 2 hvy. melting	....	36.00
No. 2 bundles	....	36.00
No. 1 busheling	....	36.00
Long turnings	$24.00 to	25.00
Shoveling turnings	....	27.00
Cast iron borings	....	26.00
Bar crops and plate	38.00 to	38.50
Structural and plate	38.00 to	38.50
No. 1 cast	37.50 to	42.50
Stove plate	37.00 to	40.00
Steel axles	36.00 to	37.00
Scrap rails	38.00 to	39.00
Rerolling rails	39.00 to	40.00
Angles & splice bars	38.00 to	39.00
Rails 3 ft. & under	38.00 to	41.00
Cast iron carwheels	32.00 to	32.50

YOUNGSTOWN

Per gross ton delivered to consumer:†

No. 1 hvy. melting	$38.00 to $44.00
No. 2 hvy. melting	38.00 to 44.00
Low phos. plate	44.00 to 44.50
Mach. shop turn	32.00 to 32.50
Short shov. turn	33.50 to 34.00
Cast iron borings	32.00 to 32.50
Elec. furnace punch.	44.00 to 44.50

NEW YORK

Brokers' buying prices per gross ton, on cars:

No. 1 hvy. melting	$36.00 to $37.00
No. 2 hvy. melting	36.00 to 37.00
Comp. black bundles	36.00 to 37.00
Comp. galv. bundles	35.00 to 36.00
Mach. shop turn.	26.00 to 27.00
Mixed bor. & turn.	26.00 to 27.00
Shoveling turn.	28.50 to 29.00
No. 1 cupola cast	43.00 to 45.00
Hvy. breakable cast	41.00 to 43.00
Charging box cast	$41.00 to $43.00
Stove plate	41.00 to 43.00
Clean auto cast	41.00 to 43.00
Unstrip. motor blks.	39.00 to 41.00
Cl'n chem. cast bor.	.... 29.00

†See box above.

BUFFALO

Per gross ton delivered to consumer:†

No. 1 hvy. melting	$37.50 to $41.00
No. 2 hvy. melting	37.50 to 41.00
No. 1 bundles	37.50 to 41.00
No. 2 bundles	37.50 to 41.00
Mach. shop turn.	29.00 to 30.00
Shoveling turn.	31.00 to 32.00
Cast iron borings	29.00 to 30.00
Mixed bor. & turn.	29.00 to 30.00
No. 1 cupola cast	40.00 to 45.00
Charging box cast	29.00 to 30.00
Stove plate	30.00 to 35.00
Clean auto cast	35.00 to 40.00
Malleable	45.00 to 47.00
Low phos. plate	40.00 to 43.00
Scrap rails	32.00 to 35.00
Rails 3 ft. & under	40.00 to 43.00
RR. steel wheels	40.00 to 43.00
Cast iron carwheels	40.00 to 43.00
RR. coil & leaf spgs.	40.00 to 43.00
RR. knuckles & coup.	38.00 to 40.00
No. 1 busheling	37.50 to 41.00

CLEVELAND

Per gross ton delivered to consumer:†

No. 1 hvy. melting	$37.50 to $38.50
No. 2 hvy. melting	37.50 to 38.50
Compressed sheet stl.	37.50 to 38.50
Drop forge flashings	37.50 to 38.50
No. 2 bundles	37.50 to 38.50
Mach. shop turn.	31.00 to 32.00
Short shovel.	32.00 to 33.00
No. 1 busheling	37.50 to 39.50
Steel axle turn.	37.50 to 38.50
Cast iron borings	32.00 to 33.00
Mixed bor. & turn.	32.00 to 33.00
No. 1 machinery cast	45.00 to 49.00
Malleable	45.00 to 49.00
Railroad cast	45.00 to 49.00
Railroad grate bars	40.00 to 44.00
Stove plate	40.00 to 45.00
RR. hvy. melting	37.00 to 38.00
Rails 3 ft. & under	48.00 to 49.00
Rails 18 in. & under	48.00 to 49.00
Elec. furnace punch.	41.50 to 43.50

SAN FRANCISCO

Per gross ton delivered to consumer:

No. 1 hvy. melting	....	$19.50
No. 2 hvy. melting	....	19.50
No. 2 bales	....	19.50
No. 3 bales	....	16.00
Mach. shop turn.	....	13.00
Elec. furn. 1 ft. und.	....	25.00
No. 1 cupola cast	$32.00 to	33.00
RR. hvy. melting	....	20.50

LOS ANGELES

Per gross ton delivered to consumer:

No. 1 hvy. melting	....	$19.50
No. 2 hvy. melting	....	19.50
No. 1 bales	....	19.50
No. 2 bales	....	19.50
No. 3 bales	....	16.00
Mach. shop turn.	....	14.50
No. 1 cupola cast	$35.00 to	36.00
RR. hvy. melting	....	20.50

SEATTLE

Per gross ton delivered to consumer:

No. 1 & No. 2 hvy. melting	....	$20.00
Elec. furn. 1 ft. und.	....	22.50
No. 1 cupola cast	....	29.00
RR. hvy. melting	....	21.00

HAMILTON, ONT.

Per gross ton delivered to consumer:

Cast grades f.o.b. shipping point

Heavy melting	$17.50*
No. 1 bundles	17.50*
No. 2 bundles	17.00*
Mixed steel scrap	15.50*
Rails, remelting	18.50*
Rails, rerolling	21.50*
Bushelings	13.00*
Mixed borings & turnings	12.50*
Electric furnace bundles	20.50*
Manganese steel scrap	20.00*
No. 1 cast	19.00*
Stove plate	17.50*
Car wheels, cast	19.50*
Malleable iron	16.00*

* Ceiling price

Comparison of Prices . .

Advances over past week in Heavy Type, declines in *Italics*. Prices are f.o.b. major basing points. The various basing points for finished and semifinished steel are listed in the detailed price tables.

Flat-Rolled Steel: (cents per pound)	Mar. 25, 1947	Mar. 18, 1947	Feb. 25, 1947	Mar. 26, 1946
Hot-rolled sheets	2.50	2.50	2.50	2.425
Cold-rolled sheets	3.20	3.20	3.20	3.275
Galvanized sheets (10 ga.)	3.55	3.55	3.55	4.05*
Hot-rolled strip	2.50	2.50	2.50	2.35
Cold-rolled strip	3.20	3.20	3.20	3.05
Plates	2.65	2.65	2.65	2.50
Plates, wrought iron	5.95	5.95	5.95	4.112
Stain's c-r strip (No. 302)	30.30	30.30	30.30	28.00
*24 ga				
Tin and Terneplate: (dollars per base box)				
Tinplate, standard cokes.	$5.75	$5.75	$5.75	$5.00
Tinplate, electro (0.50 lb)	5.05	5.05	5.05	4.50
Special coated mfg. ternes	4.90	4.90	4.90	4.30
Bars and Shapes: (cents per pound)				
Merchant bars	2.60	2.60	2.60	2.50
Cold-finished bars	3.20	3.20	3.20	3.10
Alloy bars	3.05	3.05	3.05	2.92
Structural shapes	2.50	2.50	2.50	2.35
Stainless bars (No. 302).	26.00	26.00	26.00	24.00
Wrought iron bars	6.15	6.15	6.15	4.76
Wire and Wire Products: (cents per pound)				
Bright wire	3.30	3.30	3.30	3.05
Wire nails	3.75	3.75	3.75	3.25
Rails: (dollars per 100 lb)				
Heavy rails	$2.50	$2.50	$2.50	$43.39*
Light rails	2.85	2.85	2.85	49.18*
*per net ton				
Semifinished Steel: (dollars per gross ton)				
Rerolling billets	$42.00	$42.00	$42.00	$39.00
Sheet bars	50.00	50.00	50.00	38.00
Slabs, rerolling	42.00	42.00	42.00	39.00
Forging billets	50.00	50.00	50.00	47.00
Alloy blooms, billets, slabs	61.00	61.00	61.00	58.43
Wire Rods and Skelp: (cents per pound)				
Wire rods	2.55	2.55	2.55	2.30
Skelp	2.35	2.35	2.35	2.05

Pig Iron: (per gross ton)	Mar. 25, 1947	Mar. 18, 1947	Feb. 25, 1947	Mar. 26, 1946
No. 2, foundry, Phila.	$36.51	$36.51	$32.51	$28.34
No. 2, Valley furnace	33.50	33.50	30.50	26.50
No. 2, Southern, Cin'ti	34.75	34.75	31.75	26.94
No. 2, Birmingham	29.88	29.88	26.88	22.88
No. 2, foundry, Chicago†	33.00	33.00	30.50	26.50
Basic, del'd eastern Pa.	36.92	36.92	33.67	27.84
Basic, Valley furnace	33.00	33.00	30.00	26.00
Malleable, Chicago†	33.50	33.50	30.50	26.50
Malleable, Valley	33.50	33.50	30.50	26.50
Charcoal, Chicago	45.99	45.99	42.99	42.34
Ferromanganese‡	135.00	135.00	135.00	135.00

† The switching charge for delivery to foundries in the Chicago district is $1 per ton.
‡ For carlots at seaboard.

Scrap: (per gross ton)				
Heavy melt'g steel, P'gh.	$41.00	$41.00	$35.50	$20.00
Heavy melt'g steel, Phila.	*40.25*	40.75	34.50	18.75
Heavy melt'g steel, Ch'go	37.25	37.25	32.25	18.75
No. 1, hy. comp. sheet, Det.	35.00	35.00	33.00	17.32
Low phos. plate, Youngs'n	*44.25*	45.25	41.25	22.50
No. 1, cast, Pittsburgh	44.50	44.50	42.50	20.00
No. 1, ctst, Philadelphia.	50.00	50.00	46.00	20.00
No. 1, cast, Chicago	46.50	46.50	44.25	20.00
Coke, Connellsville: (per net ton at oven)				
Furnace coke, prompt	$9.00	$9.00	$9.00	$7.50
Foundry coke, prompt	10.25	10.25	10.25	9.00
Nonferrous Metals: (cents per pound to large buyers)				
Copper, electro., Conn.	21.50	21.50	19.75	12.00
Copper, Lake, Conn.	21.625	21.625	19.625	12.00
Tin, Straits, New York	70.00	70.00	70.00	52.00
Zinc, East St. Louis	10.50	10.50	10.50	8.25
Lead, St. Louis	14.80	14.80	12.80	6.35
Aluminum, virgin	15.00	15.00	15.00	15.00
Nickel, electrolytic	37.67	37.67	37.67	35.00
Magnesium, ingot	20.50	20.50	20.50	20.50
Antimony, Laredo, Tex.	33.00	33.00	28.25	14.50

Composite Prices . .

Starting with the issue of Apr. 22, 1943, the weighted finished steel index was revised for the years 1941, 1942 and 1943. See explanation of the change on p. 90 of the Apr. 22, 1943, issue. Index revised to a quarterly basis as of Nov. 16, 1944; for details see p. 98 of that issue. The finished steel composite prices for the current quarter are an estimate based on finished steel shipments for the previous quarter. These figures will be revised when the actual data of shipments for this quarter are compiled.

	FINISHED STEEL	PIG IRON	SCRAP STEEL
Mar. 25, 1947	2.86354¢ per lb.	$33.15 per gross ton	$39.50 per gross ton
One week ago	2.86354¢ per lb.	$33.15 per gross ton	$39.67 per gross ton
One month ago	2.86354¢ per lb.	$30.15 per gross ton	$34.08 per gross ton
One year ago	2.54490¢ per lb.	$26.12 per gross ton	$19.17 per gross ton

	FINISHED STEEL HIGH	FINISHED STEEL LOW	PIG IRON HIGH	PIG IRON LOW	SCRAP STEEL HIGH	SCRAP STEEL LOW
1947	2.86354¢	2.86354¢	$33.15 Mar. 11	$30.14 Jan. 7	$39.67 Mar. 18	$31.00 Jan. 7
1946	2.83599¢ Dec. 31	2.54490¢ Jan. 1	30.14 Dec. 10	25.37 Jan. 1	31.17 Dec. 24	19.17 Jan. 1
1945	2.44104¢ Oct. 2	2.38444¢ Jan. 2	25.37 Oct. 23	23.61 Jan. 2	19.17 Jan. 2	18.92 May 22
1944	2.30837¢ Sept. 5	2.21189¢ Oct. 5	$23.61	$23.61	19.17 Jan. 11	15.76 Oct. 24
1943	2.29176¢	2.29176¢	23.61	23.61	$19.17	$19.17
1942	2.28249¢	2.28249¢	23.61	23.61	19.17	19.17
1941	2.43078¢	2.43078¢	$23.61 Mar. 20	$23.45 Jan. 2	$22.00 Jan. 7	$19.17 Apr. 10
1940	2.30467¢ Jan. 2	2.24107¢ Apr. 16	23.45 Dec. 23	22.61 Jan. 2	21.83 Dec. 30	16.04 Apr. 9
1939	2.35367¢ Jan. 3	2.26689¢ May 16	22.61 Sept. 19	20.61 Sept. 12	22.50 Oct. 3	14.08 May 16
1938	2.58414¢ Jan. 4	2.27207¢ Oct. 18	23.25 June 21	19.61 July 6	15.00 Nov. 22	11.00 June 7
1937	2.58414¢ Mar. 9	2.32263¢ Jan. 4	23.25 Mar. 9	20.25 Feb. 16	21.92 Mar. 30	12.67 June 9
1936	2.32263¢ Dec. 28	2.05200¢ Mar. 10	19.74 Nov. 24	18.73 Aug. 11	17.75 Dec. 21	12.67 June 8
1935	2.07642¢ Oct. 1	2.06492¢ Jan. 8	18.84 Nov. 5	17.83 May 14	13.42 Dec. 10	10.33 Apr. 29
1934	2.15367¢ Apr. 24	1.95757¢ Jan. 2	17.90 May 1	16.90 Jan. 27	13.00 Mar. 13	9.50 Sept. 25
1933	1.95578¢ Oct. 3	1.75836¢ May 2	16.90 Dec. 5	13.56 Jan. 3	12.25 Aug. 8	6.75 Jan. 3
1932	1.89196¢ July 5	1.83901¢ Mar. 1	14.81 Jan. 5	13.56 Dec. 6	8.50 Jan. 12	6.43 July 5
1931	1.99626¢ Jan. 13	1.86586¢ Dec. 29	15.90 Jan. 6	14.79 Dec. 15	11.33 Jan. 6	8.50 Dec. 29
1930	2.25488¢ Jan. 7	1.97319¢ Dec. 9	18.21 Jan. 7	15.90 Dec. 16	15.00 Feb. 18	11.25 Dec. 9
1929	2.31773¢ May 28	2.26498¢ Oct. 29	18.71 May 14	18.21 Dec. 17	17.58 Jan. 29	14.08 Dec. 8

Weighted index based on steel bars, shapes, plates, wire, rails, black pipe, hot and cold-rolled sheets and strip, representing 78 pct of the United States output. Index recapitulated in Aug. 28, 1941, issue.

Based on averages for basic iron at Valley furnaces and foundry iron at Chicago, Philadelphia, Buffalo, Valley and Birmingham.

Based on No. 1 heavy melting steel scrap quotations to consumers at Pittsburgh, Philadelphia and Chicago.

Iron and Steel Prices . . .

Steel prices shown here are f.o.b. basing points in cents per pound or dollars per gross ton. Extras apply. Delivered prices do not reflect 3 pct tax on freight. Industry practice has discontinued arbitrary f.o.b. prices at Gulf and Pacific Ports. Space limitations prevent quotation of delivered prices at major ports. (1) Commercial quality sheet grade; primes, 25c above base. (2) Commercial quality grade. (3) Widths up to 12-in. inclusive. (4) 0.25 carbon and less (5) Applies to certain width and length limitations. (6) For merchant trade. (7) For straight length material only from producer to consumer. (8) Also shafting. For quantities of 20,000 lb to 39,999 lb. (9) Carload lot in manufacturing trade. (10) This base price for annealed, bright finish wire, commercial spring wire. (11) Boxed. (12) Produced to dimensional tolerances in AISI Manual Sec. 6. (13) Delivered San Francisco only: Includes 3 pct freight tax. (14) Delivered Kaiser Co. prices; includes 3 pct freight tax. (15) 0.035 to 0.075 in. thick by ¾ to 3⅛ in. wide. (16) Some producers are charging 2.75c.

Basing Points	Pittsburgh	Chicago	Gary	Cleveland	Birmingham	Buffalo	Youngstown	Sparrows Point	Granite City	Middletown, Ohio		San Franc'co, Los Angeles, Seattle	DELIVERED TO Detroit	New York	Philadelphia
INGOTS															
Carbon, rerolling	($35.00 f. o. b. mill)														
Carbon, forging	$40.00	$40.00	$40.00	$40.00	$40.00	$40.00	$40.00								
Alloy	$52.00						Canton=$52.00)								
BILLETS, BLOOMS, SLABS															
Carbon, rerolling	$42.00	$42.00	$42.00	$42.00	$42.00	$42.00	(Provo=$53.20) $42.00	$42.00					$45.00		
Carbon, forging billets	$50.00	$50.00	$50.00	$50.00	$50.00	$50.00	(Provo=$61.20, Duluth=$52.00[13]) $50.00						$53.00		
Alloy	$61.00	$61.00				$61.00	(Bethlehem, Massillon, Canton=$61.00)						$64.00		
SHEET BARS							$53.00								
PIPE SKELP	2.35¢	2.35¢					2.35¢	2.35¢	(Coatesville=2.35¢)						
WIRE RODS	2.55¢	2.55¢		2.55¢	2.55¢	(Worcester=2.65¢)						3.27¢[13]			
SHEETS															
Hot-rolled	2.50¢	2.50¢	2.50¢	2.50¢	2.50¢	2.50¢	2.50¢	2.50¢	2.875¢	2.50¢			2.65¢	2.79¢	2.70¢
Cold-rolled [1]	3.20¢	3.20¢	3.20¢	3.20¢		3.20¢	3.20¢		3.30¢				3.35¢	3.61¢	3.58¢
Galvanized (10 gage)	3.55¢	3.55¢	3.55¢		3.55¢		3.55¢	3.55¢	3.65¢					3.84¢	3.75¢
Enameling (12 gage)	3.55¢	3.55¢	3.55¢	3.55¢			3.55¢		3.65¢				3.70¢	3.95¢	3.93¢
Long ternes [2] (10 gage)	3.55¢	3.55¢	3.55¢											3.95¢	3.91¢
STRIP															
Hot-rolled [3]	2.50¢	2.50¢	2.50¢	2.50¢[15]	2.50¢		2.50¢						2.65¢	2.93¢	2.88¢
Cold-rolled [4]	3.20¢	3.30¢		3.20¢			3.20¢			(Worcester=3.40¢)			3.35¢	3.61¢	3.58¢
Cooperage stock	2.80¢	2.80¢			2.80¢		2.80¢							3.09¢	
TINPLATE															
Standard cokes, base box	$5.75	$5.75	$5.75		$5.85			$5.85	$5.85		(Warren, Ohio=$5.75)			$6.157	$6.062[11]
Electro, box 0.25 lb.	Deduct 90¢ from standard coke base box price.														
Electro, box 0.50 lb.	Deduct 70¢ from standard coke base box price.														
Electro, box 0.75 lb.	Deduct 50¢ from standard coke base box price.														
BLACKPLATE															
29 gage [5]	3.60¢	3.60¢	3.60¢		3.70¢			3.70¢	3.70¢		(Warren, Ohio=$5.75)			3.99¢	3.90¢
TERNES, MFG.															
Special coated, base box	Deduct 85¢ from standard coke base box price.														
BARS															
Carbon steel	2.60¢	2.60¢	2.60¢	2.60¢	2.60¢	2.60¢	2.60¢					3.285¢	2.75¢	3.01¢	2.98¢
Rail steel [6, 16]	2.60¢	2.60¢	2.60¢	2.60¢	2.60¢	2.60¢									
Reinforcing (billet) [7]	2.45¢	2.45¢	2.45¢	2.45¢	2.45¢	2.45¢	2.45¢	2.45¢				2.985¢		2.74¢	2.65¢
Reinforcing (rail) [7, 16]	2.60¢	2.60¢	2.60¢	2.60¢	2.60¢	2.60¢	2.60¢								
Cold-finished [8]	3.20¢	3.20¢	3.20¢	3.20¢		3.20¢	(Detroit=3.25¢)							3.61¢	3.58¢
Alloy, hot-rolled	3.05¢	3.05¢				3.05¢	3.05¢	(Bethlehem, Massillon, Canton=3.05¢)					3.20¢		3.19¢
Alloy, cold-drawn	3.80¢	3.80¢	3.80¢	3.80¢		3.80¢							3.95¢		
PLATE															
Carbon steel [12]	2.65¢	2.65¢	2.65¢	2.65¢	2.65¢		2.65¢	(Coatesville, Claymont=2.80¢, Geneva, Utah=2.80¢) 2.65¢				3.46¢[14]		2.87¢	2.85¢
Floor plates	3.90¢	3.90¢												4.30¢	4.28¢
Alloy	3.79¢	3.79¢			(Coatesville=4.10¢)									4.01¢	3.895¢
SHAPES															
Structural	2.50¢	2.50¢	2.50¢		2.50¢	2.50¢	(Geneva, Utah=2.65¢) (Bethlehem=2.50¢)					3.41¢[14]		2.70¢	2.64¢
SPRING STEEL, C-R															
0.26 to 0.40 carbon	3.20¢			3.20¢			(Worcester=3.40¢)								
0.41 to 0.60 carbon	4.70¢			4.70¢			(Worcester=4.90¢)								
0.61 to 0.80 carbon	5.30¢			5.30¢			(Worcester=5.50¢)								
0.81 to 1.00 carbon	6.80¢			6.80¢			(Worcester=7.00¢)								
Over 1.00 carbon	9.10¢			9.10¢			(Worcester=9.30¢)								
MANUFACTURERS' WIRE [9]															
Bright [10]	3.30¢	3.30¢		3.30¢	3.30¢		(Worcester=3.40¢, Duluth=3.35¢)					5.63¢[13]		3.71¢	3.68¢
Galvanized	Add proper size extra and galvanizing extra to Bright Wire Base														
Spring (high carbon)	4.25¢	4.25¢		4.25¢		(Worcester=4.35¢, Duluth=4.50¢)				(Trenton=4.50¢)		5.24¢[13]		4.66¢	4.345¢
PILING															
Steel sheet	3.00¢	3.00¢				3.00¢								3.41¢	3.36¢

CORROSION AND HEAT RESISTANT STEELS

In cents per pound, f.o.b. basing point

Basing Point	Chromium Nickel		Straight Chromium			
	No. 304	No. 302	No. 410	No. 430	No. 442	No. 446
Ingot, P'gh, Chi, Canton, Balt, Reading, Ft. Wayne, Phila.	Subject to negotiation			Subject to negotiation		
Blooms, P'gh, Chi, Canton, Phila, Reading, Ft. Wayne, Balt.	22.99	24.67	17.01	17.47	20.69	25.29
Slabs, P'gh, Chi, Canton, Balt, Phila, Reading	22.99	24.67	17.01	17.47	20.69	25.29
Billets, P'gh, Chi, Canton, Watervliet, Syracuse, Balt.	Subject to negotiation			Subject to negotiation		
Billets, forging, P'gh, Chi, Canton, Dunkirk, Balt, Phila, Reading, Water, Syracuse, Ft. Wayne, Titusville	23.00	22.50	17.50	17.50	21.00	25.50
Bars, h-r, P'gh, Chi, Canton, Dunkirk, Watervliet, Syracuse, Balt, Phila, Reading, Ft. Wayne, Titusville	27.50	28.00	20.50	21.00	24.50	30.00
Bars, c-f, P'gh, Chi, Cleve, Canton, Dunkirk, Syracuse, Balt, Phila, Reading, Ft. Wayne, Watervliet	27.50	28.00	20.50	21.00	24.50	30.00
Plates, P'gh, Middletown, Canton	31.50	29.50	23.50	24.00	28.00	33.00
Shapes, structural, P'gh, Chi	27.50	28.00	20.50	21.00	24.50	30.00
Sheets, P'gh, Chi, Middletown, Canton, Balt.	39.00	37.00	29.00	31.50	35.50	39.50
Strip, h-r, P'gh, Chi, Reading, Canton, Youngstown	25.50	23.50	18.50	19.00	28.00	38.00
Strip, c-r, P'gh, Cleve, Newark, N. J., Reading, Canton, Youngstown	32.50	30.50	24.00	24.50	35.00	56.50
Wire, c-d, Cleve, Dunkirk, Syracuse, Balt, Reading, Canton, P'gh, Newark, N. J. Phila., Ft. Wayne	27.50	28.00	20.50	21.00	24.50	30.00
Wire, flat, c-r, Cleve, Balt, Reading, Dunkirk, Canton	32.48	30.30	23.80	24.34	34.62	56.26
Rod, h-r, Syracuse	27.05	25.97	20.02	20.56	24.34	29.75
Tubing, seamless, P'gh, Chi, Canton, (4 to 8 in.)	72.09	72.09	.....	68.49	.....	.....

TOOL STEEL

*(F.o.b. Pittsburgh, Bethlehem, Syracuse, Dunkirk. *Also Canton, O.)*

An increase of 8.2 pct applies to base price and extras

	Base per lb
High speed	67¢
Straight molybdenum	54¢
Tungsten-molybdenum	57½¢
High-carbon-chromium*	43¢
Oil hardening*	24¢
Special carbon*	22¢
Extra carbon*	18¢
Regular carbon*	14¢

Warehouse prices on and east of Mississippi are 2¢ per lb higher; west of Mississippi 3¢ higher.

ELECTRICAL SHEETS

Base, all grades f.o.b. Pittsburgh

	Per lb
Field grade	4.20¢
Armature	4.50¢
Electrical	5.00¢
Motor	5.70¢
Dynamo	6.45¢
Transformer 72	6.95¢
Transformer 65	7.65¢
Transformer 58	8.35¢
Transformer 52	9.15¢

F.o.b. Chicago and Gary, field grade through motor; f.o.b. Granite City, add 10¢ per 100 lb on field grade to and including dynamo.

RAILS, TRACK SUPPLIES

(F.o.b. mill)

Standard rails, heavier than 60 lb	
No. 1 O.H., per 100 lb	$2.50
Angle splice bars, 100 lb	3.00
(F.o.b. basing points)	*per 100 lb*
Light rails (from billets)	$2.85
Light rails (from rail steel), f.o.b. Williamsport, Pa.	2.95

	Base per lb
Cut spikes	4.50¢
Screw spikes	6.40¢
Tie plate, steel	2.80¢
Tie plates, Pacific Coast	2.95¢
Track bolts	6.50¢
Track bolts, heat treated, to rail roads	6.75¢
Track bolts, jobbers discount	63-5

Basing points, light rails, Pittsburgh, Birmingham; cut spikes and tie plates—Pittsburgh, Chicago, Portsmouth, Ohio, Weirton, W. Va., St. Louis, Kansas City, Minnequa, Colo., Birmingham and Pacific Coast ports; tie plates alone—Steelton, Pa., Buffalo. Cut spikes alone—Youngstown, Lebanon, Pa., Richmond, add 25¢.

ROOFING TERNEPLATE

(F.o.b. Pittsburgh, 112 sheets)

	20x14 in.	20x28 in.
8-lb coating I.C.	$6.75	$13.50

CLAD STEEL

Base prices, cents per pound

Stainless-clad	*Plate*	*Sheet*
No. 304, 20 pct, f.o.b. Pittsburgh, Washington, Coatesville, Pa.	24.00*	22.00
Nickel-clad 10 pct, f.o.b. Coatesville, Pa.	21.50	....
Inconel-clad 10 pct, f.o.b. Coatesville	30.00	....
Monel-clad 10 pct, f.o.b. Coatesville	29.00	....
Aluminized steel Hot dip, 20 gage, f.o.b. Pittsburgh	....	9.00

*Includes annealing and pickling.

MERCHANT WIRE PRODUCTS

To the dealer f.o.b. Pittsburgh, Chicago, Cleveland, Birmingham, Duluth

	Base per keg	*Delivered San Francisco*
Standard, galvanized and coated nails	$3.75†	$4.83
Cut nails, carloads, Pittsburgh base	5.30	....

†10¢ additional at Cleveland, 30¢ at Worcester.

	Base per 100 lb	
Annealed fence wire	$3.95‡	$4.96
Annealed galv. fence wire	4.40‡	5.41

‡10¢ additional at Worcester.

To the dealer f.o.b. Pittsburgh, Chicago, Birmingham

	Base column	
Woven wire fence*	84	107
Fence posts, carloads	82††	...
Single loop bale ties	86	110
Galvanized barbed wire**	94	114
Twisted barbless wire	94	...

* 15½ gage and heavier. ** On 80-rod spools in carload quantities. †† Pittsburgh; Duluth 90.

HIGH STRENGTH, LOW ALLOY STEELS

base prices, cents per pound

Steel	Alde-cor	Corten	Double Strength No. 1	Dyn-alloy	HI Steel	Mayari R	Otis-coloy	Yoloy	Y-50	NAX High Tensile
Producer	Repub-lic	Carnegie-Illinois, Republic	Repub-lic	Alan Wood	Inland	Bethle-hem	Jones & Laughlin	Youngs-town Sheet & Tube	Amer-ican Rolling Mill	Great Lakes Steel
Plates	4.10	4.10	4.10	4.10	4.10	4.10	4.10	4.10	....	4.10
Sheets										
Hot-rolled	3.85	3.85	3.85	3.85	3.85	3.85	3.85	3.85	....	3.75
Cold-rolled	4.75	4.75	4.75	....	4.75	4.75	4.75	4.75	5.225*	4.55
Galvanized	....	5.40	....	....	....	5.40	....	....	....	....
Strip										
Hot-rolled	3.85	3.85	3.85	....	3.85	3.85	3.85	3.85	....	3.75
Cold-rolled	....	....	4.75	....	....	4.75	4.75	4.75	5.00*	4.55†
Shapes	....	3.85	....	....	3.85	3.85	3.85	3.85	....	....
Beams	....	3.85	....	....	....	3.85	....	....	....	....
Bars										
Hot-rolled	4.00	4.00	4.00	....	....	4.00	4.00	4.00	....	4.00
Cold-rolled	....	....	....	....	....	....	....	4.60	....	....
Bar shapes	....	4.00	....	....	4.00	4.00	4.00	4.00	....	....

* 21 gage and lighter. † Pittsburgh, add 0.10¢ at Chicago and Gary.

PIPE AND TUBING

Base discounts. F.ob. Pittsburgh and Lorain, steel buttweld and seamless. Others f.o.b. Pittsburgh only

Base price, $200.00 per net ton

Standard, threaded & coupled

Steel, buttweld	*Black*	*Galv.*
⅛-in.	55½	41
¼-in.	58½	45
1 to 3-in.	60½	47½
Wrought Iron, buttweld		
⅛-in.	2	+20
¼-in.	11½	+10
1 and 1¼-in.	17	+ 2
1½-in.	22½	1½
2-in.	23	2
Steel, lapweld		
2-in.	53	39½
2½ and 3-in.	56	42½
3½ to 6-in.	58	44½
Steel, seamless		
2-in.	52	38½
2½ and 3-in.	55	41½
3½ to 6-in.	57	43½
Wrought Iron, lapweld		
2-in.	14½	+ 5½
2½ to 3½-in.	17	+ 1½
4-in.	21	4
4½ to 8-in.	19	2½

Extra Strong, plain ends

Steel, buttweld		
⅛-in.	54½	41½
¼-in.	58½	45½
1 to 3-in.	60	48
Wrought Iron, buttweld		
⅛-in.	6½	+14
¼-in.	12½	+ 8
1 to 2-in.	22	2
Steel, lapweld		
2-in.	52	39½
2½ and 3-in.	56	43½
3½ to 6-in.	59½	47
Steel, seamless		
2-in.	51	38½
2½ and 3-in.	55	42½
3½ to 6-in.	58½	46
Wrought Iron, lapweld		
2-in.	17½	+ 2
2½ to 4-in.	26	8½
4½ to 6-in.	22	4

Basing discounts for standard pipe are for threads and couplings. For threads only, buttweld, lapweld and seamless pipe, one point higher discount (lower price) applies. For plain ends, buttweld, lapweld and seamless pipe 3-in. and smaller, three points higher discount (lower price) applies, while for lapweld and seamless 3½-in. and larger four points higher discount (lower price) applies. F.o.b. Gary prices are one point lower discount on all buttweld. On buttweld and lapweld steel pipe, jobbers are granted a discount of 5 pct. On l.c.l. shipments, prices are determined by adding 25 pct and 30 pct and the carload freight rate to the base card.

BOILER TUBES

Seamless steel and electric welded commercial boiler tubes and locomotive tubes, minimum wall. Net base prices per 100 ft, f.o.b. Pittsburgh in carload lots, cut length 4 to 24 ft, inclusive.

O.D. in In.	Gage BWG	Seamless Hot-Rolled	Seamless Cold-Drawn	Electric Weld Hot-Rolled	Electric Weld Cold-Drawn
2	13	$15.29	$18.17	$15.00	$17.95
2½	12	20.57	24.43	20.11	24.07
3	12	22.87	27.18	22.26	26.68
3½	11	28.86	34.30	28.06	33.64
4	10	35.82	42.55	34.78	41.68

CAST IRON WATER PIPE

Per net ton

6-in. to 24-in. del'd Chicago	$81.56
6-in. to 24-in. del'd New York	79.80
6-in. to 24-in., Birmingham	71.00
6-in. and larger, f.o.b. cars, San Francisco, Los Angeles for all rail shipment; rail and water shipment less	95.00

Class "A" and gas pipe, $5 extra; 4-in. pipe is $5 a ton above 6-in.

BOLTS, NUTS, RIVETS, SET SCREWS

Bolts and Nuts

(F.o.b. Pittsburgh, Cleveland, Birmingham or Chicago)

Machine and Carriage Bolts

Base discount less case lots

	Percent Off List
½ in. & smaller x 6 in. & shorter	55
9/16 & ⅝ in. x 6 in. & shorter	52
¾ in. x 6 in. & shorter	49
1⅛ in. and larger, all lengths	48
Lag, all diam over 6 in. long	48
Lag, all diam x 6 in. & shorter	50
Plow bolts	57

Nuts, Cold Punched or Hot Pressed

(Hexagon or Square)

½ in. and smaller	48
9/16 to 1 in. inclusive	47
1⅛ to 1½ in. inclusive	45
1⅝ in. and larger	44

On above bolts and nuts, excepting plow bolts, additional allowance of 15 pct for full container quantities. There is an additional 5 pct allowance for carload shipments.

Semifin. Hexagon Nuts	U.S.S.	S.A.E.
Base discount less case lots		
7/16 in. and smaller	..	51
½ in. and smaller	48	..
½ in. through 1 in.	..	48
9/16 in. through 1 in.	47	..
1⅛ in. through 1½ in.	45	46
1⅝ in. and larger	44	..

In full case lots, 15 pct additional discount. For 200 lb or more, freight allowed up to 50¢ per 100 lb, based on Cleveland, Chicago, Pittsburgh.

Stove Bolts

	Consumer
Packages, nuts separate	60 and 10
In bulk	74

On stove bolts freight allowed up to 65¢ per 100 lb based on Cleveland, Chicago, New York on lots of 200 lb or over.

Large Rivets

(½ in. and larger)

	Base per 100 Lb
F.o.b. Pittsburgh, Cleveland, Chicago, Birmingham	$5.25
F.o.b. Lebanon, Pa.	5.40

Small Rivets

(7/16 in. and smaller)

	Percent Off List
F.o.b. Pittsburgh, Cleveland, Chicago, Birmingham	55 and 5

Cap and Set Screws

(In packages)	*Consumer*
Hexagon head cap screws, coarse or fine thread, up to and incl. 1 in. x 6 in.	56
Set screws, cup and oval points	61
Milled studs	33
Flat head cap screws, listed sizes	31
Fillister head cap, listed sizes	40

Freight allowed up to 65¢ per 100 lb based on Cleveland, Chicago or New York on lots of 200 lb or over.

FLUORSPAR

Maximum price f.o.b. consumer's plant, $30 per short ton plus either (1) rail freight from producer to consumer, or (2) rail freight from Rosiclare, Ill., to consumer, whichever is lower.

Effective CaF_2 Content:	*Base price per short ton*
70% or more	$33.00
65% but less than 70%	32.00
60% but less than 65%	31.00
Less than 60%	30.00

LAKE SUPERIOR ORES

(51.50% Fe, Natural Content, Delivered Lower Lake Ports)

	Per Gross Ton
Old range, bessemer	$5.95
Old range, non-bessemer	5.80
Mesabi, bessemer	5.70
Mesabi, non-bessemer	5.55
High phosphorus	5.55

Prices quoted retroactive to Jan. 1, 1947.

METAL POWDERS

Prices in cents per pound in ton lots, f.o.b. shipping point.

Brass, minus 100 mesh	23¢ to 27¢
Copper, electrolytic, 100 and 325 mesh	30¢ to 31½¢
Copper, reduced, 150 and 200 mesh	29¢ to 30½¢
Iron, commercial, 100, 200, 325, mesh 96 + % Fe	11¢ to 16¢
Swedish sponge iron, 100 mesh, c.i.f. N. Y., carlots, ocean bags	7.4¢ to 8¢
Iron, crushed, 200 mesh and finer, 90 + % Fe carload lots	5¢
Iron, hydrogen reduced, 300 mesh and finer, 98 + % Fe, drum lots	66¢
Iron, electrolytic, unannealed, 325 mesh and coarser, 99 + % Fe	25¢ to 31¢
Iron, electrolytic, annealed minus 100 mesh, 99 + % Fe	17¢
Iron carbonyl, 300 mesh and finer, 98-99.8 + % Fe	90¢ to $1.75
Aluminum, 100, 200 mesh, carlots	23¢ to 26¢
Antimony, 100 mesh	36.05¢
Cadmium, 100 mesh	$2.00
Chromium, 100 mesh and finer	$1.025
Lead, 100, 200 & 300 mesh	18.50¢ to 23.50¢
Manganese, minus 325 mesh and coarser	33¢
Nickel, 150 mesh	51½¢
Silicon, 100 mesh	18.15¢
Solder powder, 100 mesh	31½¢ plus metal
Tin, 100 mesh	76.75¢
Tungsten metal powder, 98%-99%, any quantity, per lb.	$2.80
Molybdenum powder, 99%, in 100-lb kegs, f.o.b. York, Pa., per lb.	$2.65
Under 100 lb	$2.90

COKE

	Net Ton
Furnace, beehive (f.o.b. oven)	
Connellsville, Pa.	$8.75 to $9.25
Foundry, beehive (f.o.b. oven)	
Connellsville, Pa.	10.00 to 10.50
Foundry, Byproduct	
Chicago, del'd	$16.10
Chicago, f.o.b.	15.10
New England, del'd	17.25
Seaboard, Kearney, N. J., f.o.b.	15.35
Philadelphia, del'd	15.46
Buffalo, del'd	16.14
Ashland, Ohio, f.o.b.	13.35
Painesville, Ohio, f.o.b.	14.60
Erie, del'd	15.75
Cleveland, del'd	15.90
Cincinnati, del'd	15.39
St. Louis, del'd	15.85
Birmingham, del'd	12.35

REFRACTORIES

(F.o.b. Works)

Fire Clay Brick

	Carloads, Per 1000
First quality, Ohio	$57.00
First quality, Pa., Md., Ky., Mo.	65.00
First quality, New Jersey	70.00
Sec. quality, Pa., Md., Ky., Mo.	59.00
Sec. quality, New Jersey	62.00
Sec. quality, Ohio	51.00
Ground fire clay, net ton, bulk	9.50

Silica Brick

Pennsylvania and Birmingham	$65.00
Chicago District	74.00
Silica cement, net ton (Eastern)	11.50
Chicago	12.50

Chrome Brick

	Per Net Ton
Standard chemically bonded, Balt., Plymouth Meeting, Chester	$59.00

Magnesite Brick

Standard, Balt. and Chester	$81.00
Chemically bonded, Baltimore	70.00

Grain Magnesite

Domestic, f.o.b. Balt. and Chester in sacks	$44.50
Domestic, f.o.b. Chewelah, Wash., in bulk	24.00
in sacks	28.00
Clinker (dead burned) dolomite, bulk, per net ton, f.o.b. York, Pa.	10.05
Midwest, add 10¢; Mo. Valley, add 20¢	

WAREHOUSE PRICES

Base prices, delivered metropolitan areas, per 100 lb.

CITIES	SHEETS			STRIP		Plates	Standard Structural Shapes	BARS		ALLOY BARS			
	Hot-Rolled (10 gage)	Cold-Rolled (15 gage)	Galvanized (10 gage)	Hot-Rolled	Cold-Rolled			Hot-Rolled	Cold-Finished	Hot-Rolled, A 4615 As-rolled	Hot-Rolled, A 4140-50 Ann.	Cold-Drawn, A 4615 As-rolled	Cold-Drawn, A 4140-50 Ann.
Philadelphia	$4.24	$5.18	$5.29	$4.43	$5.28	$4.54	$4.22	$4.48	$5.38	$8.37	$8.37	$9.88	$9.88
New York	4.42	5.17[1]	5.47	4.62	5.40	4.72	4.37	4.62	5.42	8.42	8.42	9.92	9.92
Boston	4.50	5.12[12]	5.55[12]	4.65	6.356	4.80	4.47	4.62	5.468	8.62	8.62	9.97	9.97
Baltimore	4.09	....	5.14	4.40	....	4.39	4.34	4.45	5.35	....	....	....	....
Norfolk	4.35	....	....	....	....	4.50	4.50	4.75	5.50	....	....	....	....
Chicago	....	....	....	....	5.90	....	....	....	4.95	8.10	8.10	9.35	9.35
Milwaukee	4.199	4.799	5.249	4.199	....	4.499	4.249	4.249	5.149	8.399	8.399	9.649	9.649
Cleveland	4.00	4.60	5.238	4.188	4.95	4.30†	4.311	4.05	4.95	8.358	8.358	9.35	9.35
Buffalo	4.00	4.60	5.35	4.30	5.25	4.65	4.05	4.05	4.95	8.10	8.10	9.35	9.35
Detroit	4.15	4.75	5.42	4.34	5.24	4.59†	4.42	4.20	5.12	8.51	8.51	9.74	9.74
Cincinnati	4.116	4.716	5.166	....	....	4.803	4.444	4.403	5.303	....	....	....	....
St. Louis	4.199	4.799	5.424	4.199	5.424	4.499	4.249	4.249	5.324	8.574	8.574	9.824	9.824
Pittsburgh	4.00	4.60[1]	5.05	4.00	4.95	4.30	4.05	4.05	4.95	8.10	8.10	9.35	9.35
St. Paul	4.384[7]	5.034[1]	5.434[2]	4.404[7]	....	4.684[7]	4.434[7]	4.434[7]	5.726[6]	....	10.084[6]	....	11.726[6]
Duluth	....	....	....	....	....	....	....	....	....	....	....	....	....
Omaha	4.868	6.618[1]	5.918	4.868	....	5.168	4.918	4.918	5.818	....	....	....	....
Indianapolis	....	....	....	....	....	....	....	....	....	....	....	....	....
Birmingham	3.85[11]	....	5.20	4.00[11]	....	4.30[11]	4.05[11]	4.05[11]	5.83	....	....	....	....
Memphis	4.47	....	5.97	4.72	....	4.92	4.67	4.67	5.78	....	....	....	....
New Orleans	*4.46[11]	5.77[1]	....	....	....	4.83[11]	*4.68[11]	*4.78[11]	6.14	....	....	....	....
Los Angeles	5.35	7.00[1]	6.70	5.85	8.35[5]	5.20[12]	5.20[12]	5.10[13]	6.90[14]	9.65[10]	9.35	11.05	11.05
San Francisco	4.90[8]	6.30[9]	6.45	5.20[8]	....	5.00[8]	4.90[8]	4.75[8]	7.00[10]	....	....	....	....
Seattle	5.00	7.80	6.30	5.30[4]	....	5.25[4]	4.95[4]	5.00[4]	7.10	....	....	....	....
Portland	5.00[3]	....	6.25[9]	5.50[3]	....	5.40[3]	5.10[3]	5.10[3]	7.20	....	9.30	....	....
Salt Lake City	6.25	....	7.71	6.50	....	6.10	6.25	6.25	7.50[10]	....	....	....	....

BASE QUANTITIES

Standard unless otherwise keyed on prices.

HOT-ROLLED: Sheets, strip, plates, shapes and bars, 400 to 1999 lb.

COLD-ROLLED: Sheets, 400 to 1999 lb; strip, extras on all quantities; bars 1000 lb and over.

ALLOY BARS: 1000 lb and over.

GALVANIZED SHEETS: 450 to 1499 lb.

EXCEPTIONS: (1) 400 to 1499 lb; (2) 450 to 1499 lb; (3) 300 to 4999 lb; (4) 300 to 10,000 lb; (5) 2000 lb and over; (6) 1000 lb and over; (7) 400 to 14,999; (8) 400 lb and over; (9) 450 to 1499; (10) 500 to 999; (11) 400 to 3999; (12) 450 to 3749; (13) 400 to 1999; (14) 1500 and over.

* Add 46¢ for sizes not rolled in Birmingham.

† Up to ¾ in. thick and 90 in. wide.

PIG IRON PRICES

Dollars per gross ton. Delivered prices represent minimums.

BASING POINT PRICES						DELIVERED PRICES (BASE GRADES)						
Basing Point	Basic	No. 2 Foundry	Malleable	Bessemer	Low Phos.	Consuming Point	Basing Point	Freight Rate	Basic	No. 2 Foundry	Malleable	Bessemer	Low Phos.
Bethlehem	34.00	34.50	35.00	35.50	.....	Boston	Everett	$0.50 Arb.	29.50	30.00	30.50	31.00	.....
Birdsboro	34.00	34.50	35.00	35.50	39.00	Boston	Birdsboro-Steelton	4.82	.....	.....	.....	.....	43.82
Birmingham	29.38	29.88	.....	.....	.....	Brooklyn	Bethlehem	3.00	37.00	37.50	38.00	38.50	.....
Buffalo	32.50	33.00	33.50	.....	.....	Brooklyn	Birdsboro	3.50	.....	.....	.....	.....	42.50
Chicago	32.50	33.00	33.50	34.00	.....	Cincinnati	Birmingham	4.87	34.25	34.75	.....	.....	.....
Cleveland	32.50	33.00	33.50	.....	.....	Jersey City	Bethlehem	1.84	35.84	36.34	36.84	37.34	.....
Duluth	33.00	33.50	34.00	34.50	.....	Jersey City	Birdsboro	2.33	.....	.....	.....	.....	41.33
Erie	32.50	33.00	33.50	34.00	.....	Los Angeles	Provo	5.94	38.94	39.44	.....	.....	.....
Everett	29.00	29.50	30.00	30.50	.....	Mansfield	Cleveland-Toledo	2.33	34.83	35.33	35.83	36.33	.....
Granite City	32.50	33.50	33.50	.....	.....	Philadelphia	Swedeland	1.01	36.01	36.51	37.01	37.51	.....
Neville Island	33.00	33.50	33.50	34.00	.....	Philadelphia	Birdsboro	1.49	.....	.....	.....	.....	40.49
Provo	33.00	33.50	.....	.....	.....	San Francisco	Provo	5.94	38.94	39.44	.....	.....	.....
Sharpsville	33.00	33.50	33.50	34.00	.....	Seattle	Provo	5.94	38.94	39.44	.....	.....	.....
Steelton	34.00	.....	.....	.....	39.00	St. Louis	Granite City	0.75 Arb.	33.25	34.25	34.25	.....	.....
Swedeland	37.50	35.50	36.00	36.50	.....								
Toledo	32.50	33.00	33.50	34.00	.....								
Troy, N. Y.	34.00	34.50	35.00	35.50	39.00								
Youngstown[1]	32.50	33.00	33.00	33.50	.....								

(1) Struthers Iron & Steel Co., Struthers, Ohio, charges 50¢ per ton in excess of basing point prices for No. 2 foundry, basic, bessemer and malleable.

Charcoal pig iron base price for low phosphorous $40.50 per gross ton, f.o.b. Lyles, Tenn. Delivered to Chicago, $45.99. High phosphorous charcoal pig iron is not being produced.

Basing point prices are subject to switching charges; silicon differentials (not to exceed 50¢ per ton for each 0.25 pct silicon content in excess of base grade which is 1.75 to 2.25 pct); phosphorus differentials, a reduction of 38¢ per ton for phosphorus content of 0.70 pct and over; manganese differentials, a charge not to exceed 50¢ per ton for each 0.50 pct manganese content in excess of 1.00 pct. $2 per ton extra may be charged for 0.5 to 0.75 pct nickel content and $1 per ton extra for each additional 0.25 pct nickel.

Silvery iron silicon 6.00 to 6.50 pct, C/L per g.t., f.o.b. Jackson, Ohio—$40.50; f.o.b. Buffalo—$41.75. Add $1.00 per ton for each additional 0.50 pct Si, up to 12 pct. Add 50¢ per ton for each 0.50 pct Mn over 1.00 pct. Add $1.00 per ton for 0.75 pct or more P. Bessemer ferrosilicon prices are $1.00 per ton above silvery iron prices of comparable analysis.

Ferromanganese

78-82% Mn, maximum contract base price, gross ton, lump size, f.o.b. Baltimore, Philadelphia, New York, Birmingham, Rockwood, Tenn.

Carload lots (bulk)	$135.00
Less ton lots (packed)	148.50
F.o.b. Pittsburgh	139.50

$1.70 for each 1% above 82% Mn; penalty, $1.70 for each 1% below 78%.

Briquets—cents per pound of briquet, freight allowed, 66% contained Mn.

	Eastern	Central	Western
Carload, bulk	6.40	6.65	7.20
Ton lots	7.30	7.90	9.80
Less ton lots	7.70	8.30	10.20

Spiegeleisen

Contract prices, gross ton, lump, f.o.b. Palmerton, Pa.

	16-19% Mn 3% max. Si	19-21% Mn 3% max. Si
Carloads	$43.00	$44.00
F.o.b. Pittsburgh		44.00

Manganese Metal

Contract basis, 2 in. x down, cents per pound of metal, f.o.b. shipping point, freight allowed, eastern zone.

96% min. Mn, 0.2% max. C, 1% max. Si, 2% max. Fe.

Carload, bulk	30
L.c.l. lots	32

Electrolytic Manganese

F.o.b. Knoxville, Tenn., freight allowed east of Mississippi, cents per pound.

Carloads	32
Ton lots	34
Less ton lots	36

Low-Carbon Ferromanganese

Contract price, cents per pound Mn contained, lump size, f.o.b. shipping point, freight allowed, eastern zone.

	Carloads	Ton	Less
0.10% max. C, 0.06% P, 90% Mn	21.00	21.40	21.65
0.10% max. C	20.50	20.90	21.15
0.15% max. C	20.00	20.40	20.65
0.30% max. C	19.50	19.90	20.15
0.50% max. C	19.00	19.40	19.65
0.75% max. C, 7.00% max. Si	16.00	16.40	16.65

Silicomanganese

Contract basis, lump size, cents per pound of metal, f.o.b. shipping point, freight allowed, 65-70% Mn, 17-20% Si, 1.5% max. C.

Carload, bulk	6.45
Ton lots	7.40
Briquet, contract basis, carlots, bulk freight allowed, per lb of briquet	6.15
Ton lots	7.05
Less ton lots	7.45

Silvery Iron (electric furnace)

Si 14.01 to 14.50%, $56.00 f.o.b. Keokuk, Iowa; $52.75 f.o.b. Jackson, Ohio; $54.00 f.o.b. Niagara Falls. Add $1.00 per ton for each additional 0.50% Si up to and including 18%. Add $1.00 per ton for low impurities, not to exceed: P—0.05%, S—0.04%, C—1.00%.

Silicon Metal

Contract price, cents per pound contained Si, lump size, f.o.b. shipping point, freight allowed, for ton lots packed.

	Eastern	Central	Western
96% Si, 2% Fe	14.65	16.90	18.65
97% Si, 1% Fe	15.05	17.30	19.05

Ferrosilicon Briquets

Contract price, cents per pound of briquet, bulk, f.o.b. shipping point, freight allowed to destination, 40% Si. 1 lb briquets.

	Eastern	Central	Western
Carload, bulk	3.85	4.10	4.30
Ton lots	4.75	5.35	5.65
Less ton lots	5.15	5.75	6.05

Electric Ferrosilicon

Contract price, cents per pound contained Si, lump size in carloads, f.o.b. shipping point, freight allowed.

	Eastern	Central	Western
25% Si	11.65	...	...
50% Si	7.45	7.95	8.15
75% Si	9.25	9.55	10.30
80-90% Si	10.45	10.75	11.50
90-95% Si	12.05	12.35	13.05

Ferrochrome (65-72% *Cr, 2% max. Si*)

Contract prices, cents per pound, contained Cr, lump size in carloads, f.o.b. shipping point, freight allowed.

	Eastern	Central	Western
0.06% C	23.00	23.40	24.00
0.10% C	22.50	22.90	23.50
0.15% C	22.00	22.40	23.00
0.20% C	21.50	21.90	22.50
0.50% C	21.00	21.40	22.00
1.00% C	20.50	20.90	21.50
2.00% C	19.50	19.90	20.50
65-69% Cr, 4-9% C	15.60	16.00	16.15
62-66% Cr, 4-6% C, 6-9% Si	16.60	17.00	17.15

Briquets — contract price, cents per pound of briquet, f.o.b. shipping point, freight allowed, 60% chromium.

	Eastern	Central	Western
Carload, bulk	9.85	10.10	10.20
Ton lots	10.75	11.65	12.25
Less ton lots	11.15	12.05	12.65

High-Nitrogen Ferrochrome

Low-carbon type: 67-72% Cr, 0.75% N. Add 2¢ per lb to regular low carbon ferrochrome price schedule. Add 2¢ for each additional 0.25% N.

S. M. Ferrochrome

Contract price, cents per pound chrominum contained, lump size, f.o.b. shipping point, freight allowed.

High carbon type: 60-65% Cr, 4-6% Si, 4-6% Mn, 4-6% C.

	Eastern	Central	Western
Carload	16.70	17.10	17.25
Ton lots	17.90	19.20	20.00
Less ton lots	18.60	19.90	20.70

Low carbon type: 62-66% Cr, 4-6% Si, 4-6% Mn, 1.25% max. C.

	Eastern	Central	Western
Carload	20.00	20.40	21.00
Ton lots	21.00	21.65	22.85
Less ton lots	22.00	22.65	23.85

Chromium Metal

Contract prices, cents per lb, chromium contained, carload, f.o.b. shipping point, freight allowed, 97% min. Cr, 1% max. Fe.

	Eastern	Central	Western
0.20% max. C	83.50	85.00	86.25
0.50% max. C	79.50	81.00	82.25
9.00% min. C	79.50	81.00	82.25

Calcium—Silicon

Contract price per lb of alloy, lump, f.o.b. shipping point, freight allowed.

30-35% Ca, 60-65% Si, 3.00% max. Fe or 28-32% Ca, 60.65% Si, 6.00% max. Fe.

	Eastern	Central	Western
Carloads	13.00	13.50	15.55
Ton lots	14.50	15.25	17.40
Less ton lots	15.50	16.25	18.40

Calcium—Manganese—Silicon

Contract prices, cents per lb of alloy, lump, f.o.b. shipping point, freight allowed.

16-20% Ca, 14-18% Mn, 53-59% Si.

	Eastern	Central	Western
Carloads	15.50	16.00	18.05
Ton lots	16.50	17.35	19.10
Less ton lots	17.00	17.85	19.60

Calcium Metal

Eastern zone contract prices, cents per pound of metal, f.o.b. shipping point, freight allowed. Add 1.5¢ for central zone; 3.5¢ for western zone.

	Cast	Turnings	Distilled
Ton lots	$1.60	$2.35	$2.95
Less ton lots	1.95	2.70	3.75

CMSZ

Contract price, cents per pound of alloy, f.o.b. shipping point, freight allowed.

Alloy 4: 45-49% Cr, 4-6% Mn, 18-21% Si, 1.25-1.75% Zr, 3.00-4.5% C.

	Eastern	Central	Western
Ton lots	13.50	14.60	16.55
Less ton lots	14.25	15.35	17.30

Alloy 5: 50-56% Cr, 4-6% Mn, 13.50-16.00% Si, 0.75 to 1.25% Zr, 3.50-5.00% C.

	Eastern	Central	Western
Ton lots	13.25	14.35	16.30
Less ton lots	14.00	15.10	17.05

SMZ

Contract price, cents per pound of alloy, f.o.b. shipping point, freight allowed. 60-65% Si, 5-7% Mn, 5-7% Zr, 20% Fe.

	Eastern	Central	Western
Ton lots	13.25	14.35	16.30
Less ton lots	14.00	15.10	17.05

Other Ferroalloys

Ferrotungsten, standard, lump or ¼x down, packed, f.o.b. plant Niagara Falls, Washington, Pa., York, Pa., per pound contained T, 5 ton lots, freight allowed	$2.05
Ferrovanadium, 35-55%, contract basis, f.o.b. plant, freight allowances, per pound contained V.	
Openhearth	$2.70
Crucible	$2.80
High speed steel (Primos)	$2.90
Vanadium pentoxide, 88-92% V_2O_5 technical grade, contract basis, per pound contained V_2O_5	$1.10
Ferrocolumbium, 50-60%, contract basis, f.o.b. plant, freight allowed, per pound contained Cb	
Ton lots	$2.50
Les ton lots	$2.55
Ferromolybdenum, 55-75%, f.o.b. Langeloth, Washington, Pa., per pound contained Mo	95¢
Calcium molybdate, 40-45%, f.o.b. Langeloth, Washington, Pa., per pound contained Mo	80¢
Molybdenum oxide briquets, 48-52% Mo, f.o.b. Langeloth, Pa., per pound contained Mo	80¢
Molybdenum oxide, in cans, f.o.b. Langeloth and Washington, Pa., per pound contained Mo	80¢
Ferrotitanium, 40-45%, 0.10%C max., f.o.b. Niagara Falls, N. Y., ton lots, per pound contained Ti	$1.23
Less ton lots	$1.25
Ferrotitanium, 20-25%, 0.10%C max., ton lots, per pound contained Ti	$1.35
Less ton lots	$1.40
High carbon ferrotitanium, 15-20%, 6-8% C, contract basis, f.o.b. Niagara Falls, freight allowed, carloads, per net ton	$142.50
Ferrophosphorus, electrolytic, 23-26%, carlots, f.o.b. (Siglo) Tenn., $3 unitage per gross ton	$65.00
Zirconium, 35-40%, contract basis, f.o.b. plant, freight allowed, per pound of alloy.	
Carload, lots	14.50¢
Zirconium, 12-15%, contract basis, lump, f.o.b. plant, freight allowed, per pound of alloy	
Carload, bulk	4.85¢
Alsifer, 20% Al, 40% Si, 40% Fe, contract basis, f.o.b. Niagara Falls, carload	6.25¢
Ton lots	6.75¢
Simanal, 20% Si, 20% Mn, 20% Al, contract basis, f.o.b. Philo, Ohio, freight allowed, per pound	
Car lots	8.50¢
Ton lots	9.25¢

Boron Agents

Contract prices per pound of alloy, f.o.b. shipping point, freight allowed.

Ferroboron, 17.50% min. B, 1.50% max. Si, 0.50% max. Al, 0.50% max. C.

	Eastern	Central	Western
Less ton lots	$1.30	$1.3075	$1.329

Manganese—Boron 75.00% Mn, 15-20% B, 5% max. Fe, 1.50% max. Si, 3.00% max C.

Ton lots	$1.89	$1.903	$1.935
Less ton lots	2.01	2.023	2.055

Nickel—Boron 15-18% B, 1.00% max. Al, 1.50% max. Si, 0.50% max. C, 3.00% max. Fe, balance Ni.

Less ton lots	$2.10	$2.1125	$2.1445

Silcaz, contract basis, f.o.b. plant freight allowed, per pound.

Carload lots	35¢

Grainal, f.o.b. Bridgeville, Pa., freight allowed, 50 lb and over.

No. 1	87.5¢
No. 6	60¢
No. 79	45¢

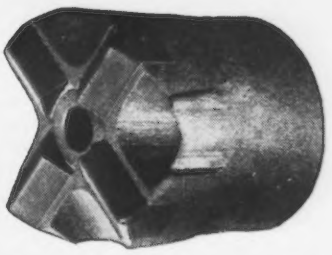
Bortram, f.o.b. Niagara Falls

Ton lots, per pound	45¢
Less ton lots, per pound	50¢

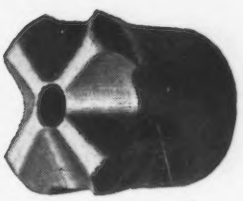
Carbortam, f.o.b., Suspension Bridge, N.Y., freight allowed, Ti 15—17%, B 0.90—1.15%, Si 2.5—3.0%, Al 1.0—2.0%.

Ton lots, per pound	8.0¢

Penetrating hard rock is easier, faster and less costly with the remarkable new Carboloy-Set 4-point Jackbit for blast hole drilling all rock formations. Developed by Carboloy Co. and Ingersoll-Rand, this new bit for percussion drilling lasts many times longer, shows tremendous shock-resisting abilities. Just another accomplishment of the hardest metal made by man.



Actual-size photograph of the new 4-point Carboloy-Set Jackbit.



1. Two feet of drilling in granite dulled the old type steel bit as shown above. Compare this with the . . .

2. . . . Carboloy-Set Jackbit after drilling 249½ feet in granite! More than 100 times longer life!

Turning hard rock to butter

GREAT NEWS of Carboloy Cemented Carbide for the mining industry and others who drill blast-holes in rock! The new Carboloy-Set Jackbit for percussion drilling substantially increases footage drilled per shift, and permits continuous drilling with one size bit, heretofore impossible.

Such performance comes from Carboloy's remarkable density and great shock-resistant qualities in cutting hard materials such as rock and metal.

A Versatile Product

In many fields, Carboloy* is proving every day its reputation among authorities as *one of the ten most important industrial developments in the last decade.*

With Carboloy, industry today in countless operations can remove more material at higher speeds than was once thought possible.

Here's why Carboloy Cemented Carbide is so important in so many production uses:

1. **Carboloy commonly triples the output of both men and machines,**
2. **Cuts, forms or draws the toughest, most abrasive modern alloys with accuracy and speed previously unknown, and**
3. **Regularly increases the quality of products.**

As a tool, die or wear-resistant machine part, Carboloy is too important to overlook. It's time you investigated.

Carboloy Company, Inc., Detroit 32, Michigan

CARBOLOY

* ...E MARK) CEMENTED CARBIDE

THE HARDEST METAL MADE BY MAN

Industrial Research Expenditures Growing, New Survey Discloses

New York

• • • **In the search** for better products, better manufacturing processes and a strong position in national and international markets, American business is spending more money for industrial research than in the years immediately preceding the war, according to a survey on industry growth through research which has just been completed by the National Industrial Conference Board.

A majority of the companies surveyed are spending a larger proportion of the sales dollar on industrial research and development today, notwithstanding the much higher level of sales, than in the immediate prewar years. Slightly less than a quarter of the reporting companies, it was found, depend exclusively on their own research facilities and laboratories. The bulk of the remaining companies are about evenly divided in their use of university facilities and commercial or independent laboratories to supplement the work done in their own laboratories. A relatively small number of the companies surveyed depend upon their trade association for research, and only a few employ outside consultants.

Increased emphasis is being placed on such activities as products improvement and application, operations' research and testing, research into processes, production methods and planning, equipment, and control. Generally, also, an increased amount of money is being put into pure research.

Improvement and redesign of existing products is given somewhat more attention than the development of those new products which represent a radical departure from existing lines.

The median percentage of outlays for industrial research among the companies included in the survey falls between 1.5 pct and 2 pct of the sales dollar. In a few instances, research costs run as high as 5 pct of the sales dollar, while a minority of companies allocate very little or nothing to research and development.

"Comparisons among industries are not always fair and no attempt has been made in the study to compute a composite figure," the survey points out. "Variations by industries and by years in the proportion of the sales dollar spent on industrial research and development must be appraised in the light of difference in basic conditions in various industries and of changes which have occurred in sales over a period of time."

Aggregate research expenditures have increased very sharply since the sales volume of most companies is substantially above prewar levels. Even where the ratio is currently below the prewar rate or the same, aggregate research expenditures in many instances show a sharp rise over 1939 and 1940. This is illustrated by the record of a railroad equipment company which showed 1.1 pct of sales spent on research both in 1946 and 1939. However, total expenditures amounted to $852,000 in 1946, as compared with $273,000 in 1939 (a gain of 212 pct).

Some raw-material producers observed that the nature of their product is such that it does not appear profitable to spend large sums in the search for new products. Instead, research is largely concentrated in the development of new techniques and processes and production equipment.

Most companies turn to outside research facilities for assistance. This is true for more than three-quarters of the companies included in the survey. The principal outside facilities used are those of colleges and universities and commercial or independent laboratories. Both are mentioned with about equal frequency. Much less frequently mentioned, but still important, are the research facilities provided by trade associations.

University and college facilities are often employed for special projects, with a few executives indicating that they favor them for pure or basic research. In some instances, fellowships are set up or grants made without any expectation of specific results or benefits. These are motivated by a desire to increase the knowledge of the industry and to inrease the supply of trained personnel.

The London Economist

(CONTINUED FROM PAGE 111)

AS elsewhere so in Russia; lack of coal is stated to be the chief problem. "The development of the coal industry, which is experiencing the greatest difficulties as a result of the war, is lagging behind and delaying the progress of the entire national economy." The criticism seems to be addressed to the central planning authorities rather than to the coal industry.

The fact is that the 1946 plan for coal output has been fulfilled. The Asiatic coal mines have fallen short of their target by 3 pct, but the European ones, which must now produce about half of Russia's coal, have produced 5 pct more than was planned. The rehabilitation of the Donetz Basin in particular, where most of the mines were flooded by the end of the war, has gone ahead, since the middle of last year, with an astonishing speed and vigor. The Donetz mines produced about 47 million tons in 1946 (11 million more than in the preceding year) —70 pct of their output in 1937.

The implication of the statement about the coal crisis is, therefore, that the planners in Moscow have not been bold enough; and that even higher targets should have been set for the extracting industries in order to speed up expansion in manufacturing industries.

Even so, it must be doubted whether lack of coal has been the decisive reason for the slow rehabilitation of Ukrainian and South Russian industries, dependent as these are on the now more plentiful Donetz coal; and the fact that the Soviet Government has now thought it possible to forego half of the stipulated coal deliveries from Polish Upper Silesia strengthens that doubt.

It is more probable that stagnation in the former occupied lands is caused by a crisis in the morale of the working population, a crisis due to disastrous housing conditions, to shortages of food and consumers' goods, and also to general postwar frustration.

The housing plan for 1946 was not fulfilled; the housing space made available amounted to 6 mil-

lion sq m. Housing difficulties are delaying the creation of permanent cadres of workers and the raising of the productivity of labor. Under the plan, 72.5 million sq m are to be built in the current 5-year period. Thus, only one twelfth of the scheduled housing space has been made available in the first year. Incidentally, the 5-year target for housing is very modest. Even if the planned building by private persons (12 million sq m) is added to it, the average housing space which the 20-odd million Soviet citizens made homeless by the war can hope to get by 1950 will at best be not more than 4 sq yd per person; and this does not allow for any increase in population. The bottleneck is in the supply of cement, bricks and timber, a bottleneck that may be much more difficult to overcome than the relative shortage of coal.

In some respects then the crisis appears to be milder than the wording of the official statements suggest; in others it is certainly even graver. But it should be remembered that the old Ukrainian and Southern Russia centers of industry are no longer as important for the Soviet economy as they used to be; and the situation in the new centers in the east is incomparably better than in the formerly occupied provinces.

The agricultural situation presents a similar difference between the west, stricken by war and drought, and the east, where life has not been so unsettled. Thus "in western Siberia and Khazakhstan the grain harvest increased by one and a half times compared with 1945." But the overall situation is grim. Restoration of the prewar grain output is not expected under 3 years; the figures of the last harvest have not been disclosed.

The peasants have failed to deliver their quotas of grain to the government; and so the stocks for feeding the urban population must be low. (Before the war deliveries of grain to the government of all sorts amounted to nearly one third of the total harvest.)

The technical standards of farming, none too high even before, have decayed. There have been acute shortages in everything; tractors, draught animals, fertilizers and skilled agriculturalists. Only half the collective farms practice rotation of crops;

shallow ploughing is very common; and wide stretches of land have been left to the weeds.

The crop of flax has been only half the normal. The rehabilitation of cotton plantations that have either fallen into disuse or been converted into rice plantations in time of war, is progressing; but it is far from completed.

Against this, 75 pct of the prewar sowing area in the western provinces is again under cultivation; and the farms there have about 50 pct of their cattle.

Yet the social, as distinct from the economic crisis in the collective farms, appears much less serious than might have been expected. Mr. Andreev has stated that nearly 12 million acres of collective land had been unlawfully taken away from the Kholkhozes and have now been returned to them. If so much land—4 pct of the total sown area—has been misappropriated by peasants, this would have been a symptom of a revival of the peasantry's individualism and of its continued opposition to the collective system.

But this has not been the case. Ten out of the 12 million acres were misappropriated by factories, offices and organizations. During the war these had been allowed (under the law of Apr. 7, 1942) to run their own auxiliary farms on untilled Kholkhoz land for the benefit of their employees and workers. After the war, the factories and offices were reluctant to return the land, preferring to go on running their own auxiliary farms on it. Less than 1½ million acres were misappropriated by the peasants themselves.

The government is not prepared to tolerate even this; and Mr. Andreev's Board for Kholkhoz Affairs has resorted to draconic measures in order to restore all the land to the collective farms. If illicit private farming has, in those years of chaos, revived on so small a scale—½ pct of the sown acreage—then the conclusion to be drawn is that the collective system has had time to strike very deep and form roots, and that the peasantry's opposition to it has almost vanished.

The picture of the crisis, as it emerges from the numerous official accounts, is rather complicated; and it shows quite a few unexpected features.

Why NICKEL Alloy Steels Are Specified for Giant Generator Shafts

Alloy steel containing two and a half percent Nickel along with small percentages of other alloying elements give the heavy sections of this turbine rotor shaft the strength, toughness and endurance so vital to dependable performance. A yield strength of 80,000 p.s.i. combined with reduction of area consistently exceeding 36% in both radial and transverse directions was achieved in this heavy section.

PHOTO COURTESY OF GENERAL ELECTRIC CO.

HEADED FOR THE LARGEST TURBO-GENERATOR OF ITS TYPE IN THE WORLD

This 75,000 pound Nickel alloy steel rotor shaft will serve in a new record size turbine generator rated at 100,000 KW, 77 feet long, 17 feet wide and designed for inlet conditions of 1250 p.s.i. and 1000° F.

INCO Nickel

TRADE MARK

Over the years, International Nickel has accumulated a fund of useful information on the selection, fabrication, treatment and performance of engineering steels, stainless steels, cast irons, brasses, bronzes and other alloys containing Nickel. This information and data are yours for the asking. Write for "List A" of available publications.

THE INTERNATIONAL NICKEL COMPANY, INC. 67 WALL STREET NEW YORK 5, N.Y.

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THE INTERNATIONAL NICKEL COMPANY, INC. 67 WALL STREET NEW YORK 5, N.Y.

Export-Import Bank To Extend $50 Million Credit to Norwegians

Washington

• • • **An agreement** providing for a line of credit of $50 million for the Norwegian Government has been announced by the Export-Import Bank.

The credit is to be used for the purchase of the following commodities and services in the amounts listed:

Iron and steel products	$12,000,000
Machines and machinery	6,000,000
Automotive vehicles & tractors	2,000,000
Ship repairs	3,000,000
Cotton and cotton yarn	3,000,000
Chemicals, copper and miscellaneous raw materials	3,000,000
Coal	6,000,000
Petroleum, oil and lubricants	5,000,000
Freight, insurance and services	10,000,000

Purchases are to be carried out to the maximum extent possible by private importers in Norway through normal commercial channels.

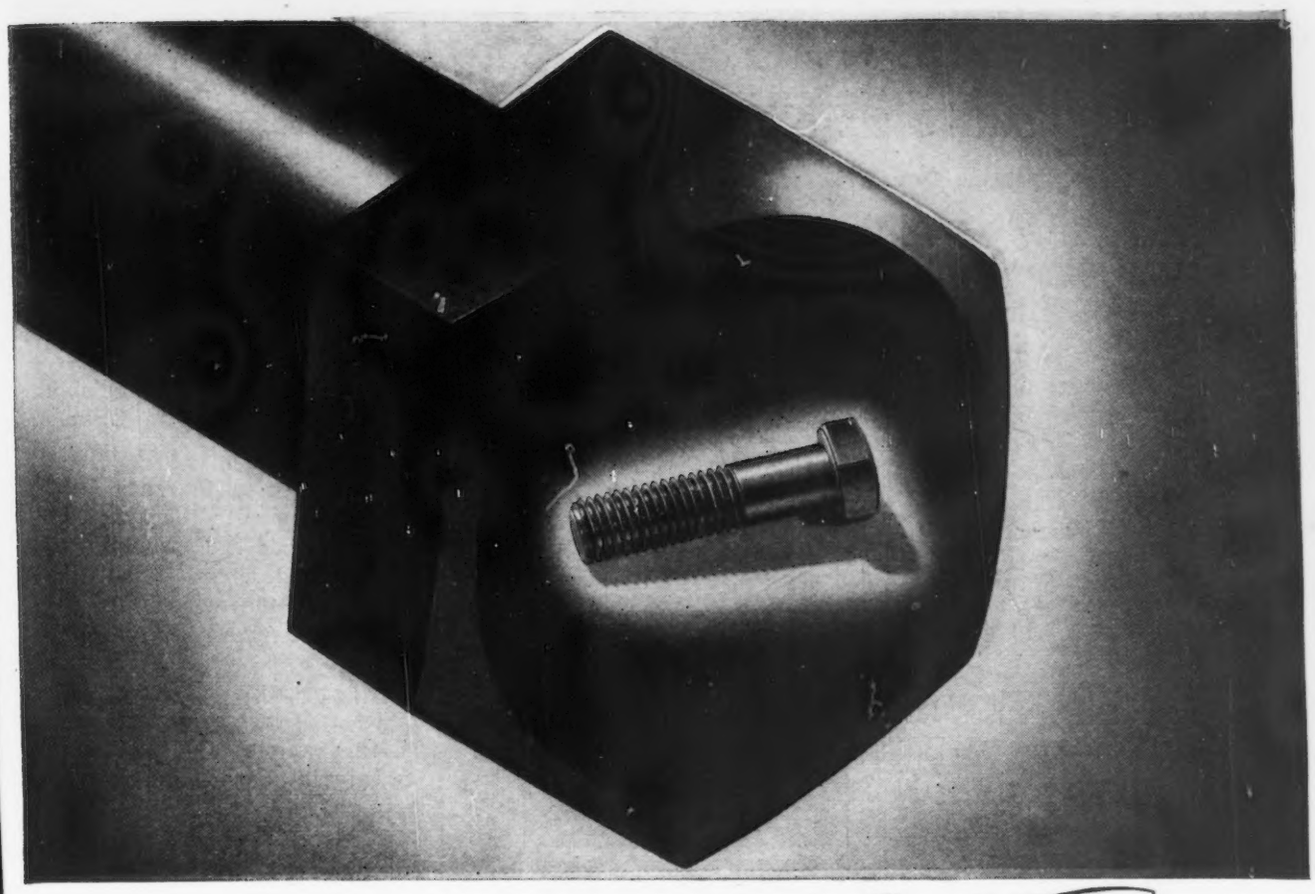
Advances under the credit may be made up to June 30, 1948. They will be payable in 36 semiannual installments beginning on June 30, 1949. Interest will be at the rate of 3 pct per annum. The Kingdom of Norway retains the right of prepaying any note on any interest payment date.

Clarifies Law on Sale Of Available Patents

Washington

• • • **Apparently intended as a response to criticism in Congress** that Soviet agents had purchased many thousands of American patents, the Dept. of Commerce issued a statement recently saying that the Patent Office under the law cannot refuse to sell any patent copy that is available. It was pointed out, however, that the law also provides for secrecy when necessary in the national interest. This law is Title 35, U. S. Code, Sec. 42. This section gives the Commissioner of Patents the power to order that an invention be kept secret and that no patent be granted during the period of war.

"After the war was over and as particular material was declassified by the War and Navy Depts. the orders of secrecy were removed in a number of cases," that Patent Office said.



WHEN YOU GET MAXIMUM HOLDING POWER PER DOLLAR OF INITIAL COST . . THAT'S t.f.e. *True Fastener Economy!*

It's the cost of *using* a fastener that counts. Wherever maximum fastener strength is required . . . such as for engines and machine tools . . . it is *T*rue *F*astener *E*conomy to specify high-quality Cap Screws.

R B & W *Cap Screws for Utmost Security*

Raw material that is subjected to the most rigid mechanical and physical examination . . . cold-forming on the most modern machinery . . . continuous inspection at every stage of manufacture . . . contribute to your assurance that RB & W Cap Screws will have uniformly high physical properties and a finish that enhances the appearance of the finished product.

Such facilities as spheroidizing furnaces, close control heat treating, finest heading and threading equipment enable R B & W to manufacture its products to meet the severe stress conditions and close tolerances required of highest quality Cap Screws.

You Get T. F. E. When You

1. Reduce assembly time to a minimum by savings through use of accurate and uniform fasteners
2. Make your men happier by giving them fasteners that make their work easier
3. Reduce need for thorough plant inspection, due to confidence in supplier's quality control
4. Reduce the number and size of fasteners by proper design
5. Purchase maximum holding power per dollar of initial cost, by specifying correct type and size of fasteners
6. Simplify inventories by standardizing on fewer types and sizes of fasteners
7. Save purchasing time by buying larger quantities from one supplier's complete line
8. Contribute to sales value of final product by using fasteners with a reputation for dependability and finish

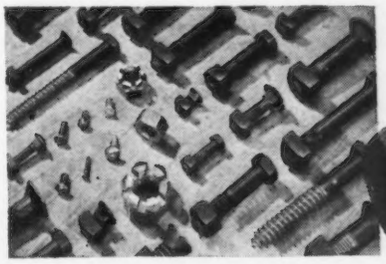
RUSSELL, BURDSALL & WARD BOLT AND NUT COMPANY

102 years making strong the things that make America strong

RB&W bolts, nuts, screws, rivets and allied fastening products are manufactured in a broad range of styles, sizes and finishes.

• • •

Plants at: Port Chester, N. Y., Coraopolis, Pa., Rock Falls, Ill., Los Angeles, Calif. Additional sales offices at: Philadelphia, Detroit, Chicago, Chattanooga, Portland, Seattle. Distributors from coast to coast. By ordering through your distributor, you can get prompt service from his stocks for your normal needs. Also—the industry's most complete, easiest-to-use catalog.



Cleveland Society To Honor Technical Man For Superior Service

Cleveland

• • • **First annual banquet** of the Cleveland Technical Societies Council, scheduled for Mar. 31, at Hotel Carter, will feature the presentation of a distinguished service award to an outstanding technical man in the Cleveland area.

According to Clarence L. Collens, chairman of the board, Reliance Electric & Engineering Co., who served as chairman of an otherwise anonymous awards committee, the award has been designed to recognize exceptional service over the years and the recipient will not be announced until the banquet night. The new award will be made annually.

Principal dinner speaker will be Dr. Howard E. Fritz, vice-president, research, B. F. Goodrich Co., Akron, who will speak on "Your Stake in This Scientific World."

Elmer L. Lindseth, president, Cleveland Electric Illuminating Co., will be toastmaster.

The Cleveland Technical Societies Council with a membership of 10,000 engineers and technical men grouped in some 35 societies was one of the first such councils in the country. Today more than 50 similar councils have been formed throughout the nation.

Inaugurating an annual banquet with a distinguished service award puts the Cleveland council in position of being first with another project to foster greater unity among the technical fraternity. Prof. G. Brooks Earnest, Case School of Applied Science, is council president.

Banquet attendance is expected to reach 1000. Chairman is Edward K. Brown, Crane Packing Co., with George R. Canning, Ohio Bell Telephone Co., as vice-chairman. Cooperating with the banquet committee is Dr. Harry B. Osborn, Jr., Ohio Crankshaft Co., who is chairman of the council joint meetings and program coordination committee.

Charges Fire Hazards Exist in City Buildings

New York

• • • **"Recent hotel** disasters have demonstrated the seriousness of existing fire hazards with which American cities have temporized too long," B. L. Wood, consulting engineer for the Committee on Building Codes of the American Iron & Steel Institute told the American Institute of Architects recently.

"No building containing open stairways or shafts can be regarded as fireproof or fire safe," he said, "but according to reports there are 372 hotels in New York City which contain such shafts and stairways.

"The fire record, with 11,000 deaths and $561 million property loss in 1946, clearly shows the deficiency in building construction and the inadequacy of building laws."

Mr. Wood said a recent study by architects indicated that apartment houses can be built of fire resistive construction in New York City on an economical basis and yielding higher income than those constructed of combustible materials. Results of the study have been published jointly by the American Iron & Steel Institute, the American Institute of Steel Construction and Steel Joist Institute.

Alco Reports Profit Rise

New York

• • • **In submitting** the company's 45th annual report, D. W. Fraser, board chairman, American Locomotive Co., reported current backlog at approximately $80 million against a corresponding figure of $71 million at the end of 1945. Consolidated net profit for 1946 of $6,808,352, or $3.04 a share, bettered 1945 earnings of $6,551,000, or $2.53 per common share.

Unfilled orders for diesel-electric locomotives were 75 pct of the total locomotive orders on hand, he said. Export bookings, predominantly steam locomotives, comprise less than 10 pct of the total current backlog. Domestic demand, again at the beginning of the year, was 90 pct for diesel power, Mr. Fraser declared.

Commenting on the company's new Alco-GE "6000" diesel elec-

tric road locomotive, Robert B. McColl, Alco president, noted that the power of the Alco 4-cycle diesel engine had been almost doubled without any increase in weight by the application of a turbosupercharger developed on the war experience of General Electric in the aviation field and American Locomotive in the railroad field. The "6000" engine, he asserted, has been built to stay on the road for nearly a million miles without major overhaul.

Offers Welding Equipment

Cleveland

• • • **Seam welding and aluminum** spot welding equipment, together with welding rods of various sizes and manufacture, are being offered for sale by Cleveland War Assets Administration as part of a $10 million national inventory being sold at fixed prices.

Thirty-one used but good aluminum spot welders of Federal Uni-Pulse, Taylor - Winfield and Sciaky manufacture, which cost the government more than $200,000, are available at Cleveland at prices ranging from $1300 to $4000. Seam welders are priced from $1100 to $5000. Both types are offered at levels from 45 to 20 pct below acquisition cost. Over 500,000 lb of welding rods which originally cost $75,000, may be purchased at prices considerably below market.

Reports Gain in '46 Income

Pittsburgh

• • • **Pittsburgh Coke & Chemical** Co. reports a net profit for 1946 of $806,845, compared with $302,984 at the close of 1945. The 1946 net income included $213,962 refund of prior years' taxes. In January 1947 the company's ore mining properties at Iron River, Mich., were sold for $1,500,000.

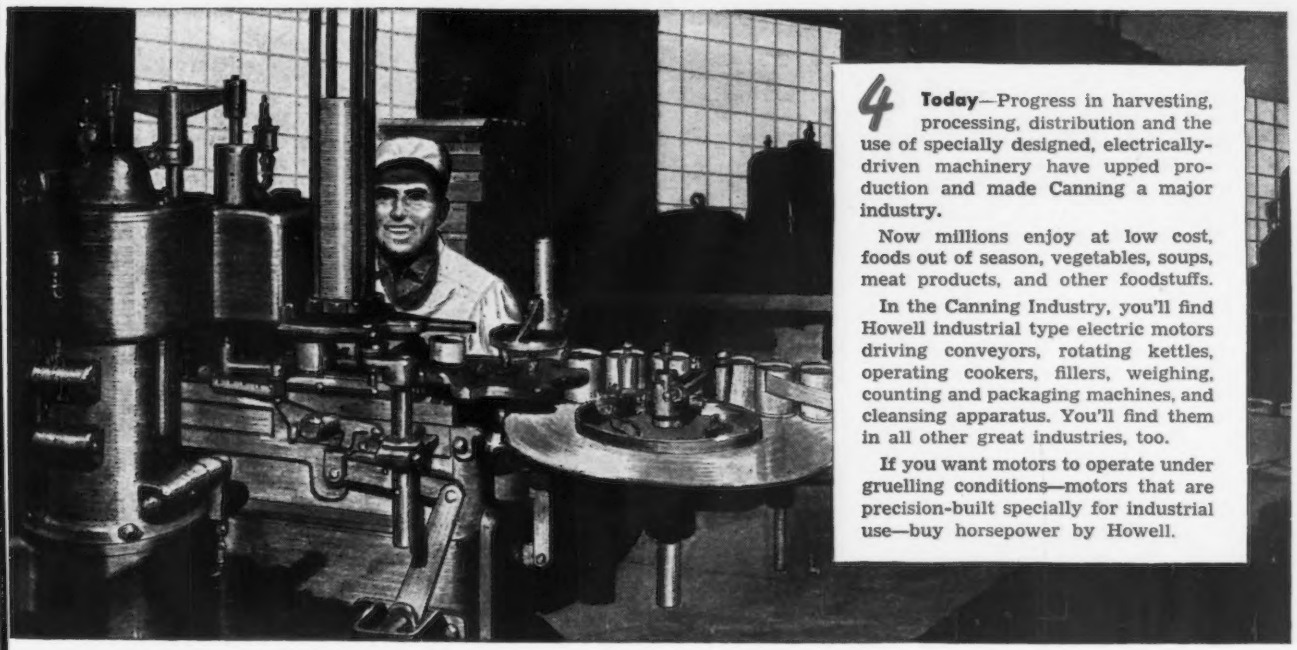
A partially-completed phthalic anhydride plant which was to be operated by the company during the war is being offered for sale by the government, and Pittsburgh Coke & Chemical hopes to acquire it and complete construction. This plant will be unique in that it has its source of raw material, naphthalene, right at the plant site. The company believes this chemical product will be in short supply for an indefinite period.

1 **1809**—"Canning" was discovered by Nicolas Appert, a Frenchman. His crude food preserving methods, using bottles for containers, won for him great acclaim and a grant of 12,000 francs from the Emperor Napoleon.

2 **1850**—The art of canning had spread far and wide. In home kitchens, barns, crude buildings, food was "preserved" for future use. Work was done by hand, mostly by women. Electrical horsepower was still to come.

3 **As early as 1915,** Howell engineers were working with machinery manufacturers to apply industrial type motors that were destined to up production, eliminate unnecessary human handling of foodstuff and cut costs.

Then canning became a major industry!



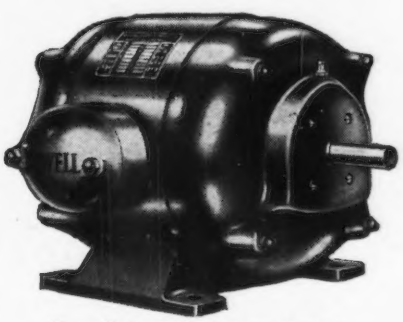
4 **Today**—Progress in harvesting, processing, distribution and the use of specially designed, electrically-driven machinery have upped production and made Canning a major industry.

Now millions enjoy at low cost, foods out of season, vegetables, soups, meat products, and other foodstuffs.

In the Canning Industry, you'll find Howell industrial type electric motors driving conveyors, rotating kettles, operating cookers, fillers, weighing, counting and packaging machines, and cleansing apparatus. You'll find them in all other great industries, too.

If you want motors to operate under gruelling conditions—motors that are precision-built specially for industrial use—buy horsepower by Howell.

Be wise—buy industrial type Howell Motors! They're designed for the toughest tasks in industry; consequently, they perform better on *all jobs!*



Howell Protected Type Motors

HOWELL MOTORS

HOWELL ELECTRIC MOTORS CO., HOWELL, MICH.

Manufacturers of Quality Industrial Type Motors Since 1915

Graphite Bronze Net Sets All-Time Record

Cleveland

• • • **Cleveland Graphite** Bronze Co. with twice as much business and twice as many employees as it had before the war, earned a record net profit of $2,468,876 in 1946, according to Ben F. Hopkins, president of the company.

Net in 1946 was equal to $7.28 a share on the 321,920 common shares outstanding. Sales were $28,230,417. Earnings in 1945, still subject to renegotiation, were reported as $1,304,391 or $3.65 a common share, on sales of $43,594,868.

In his annual report to stockholders, Mr. Hopkins stated that the year's profit would have been higher by $288,000, or 89¢ a common share, if metal inventories had been computed on the same basis as in 1945.

"If we could be assured of a continuation of circumstances as they now exist, I would feel safe in promising our stockholders and employees another fine year in 1947," Mr. Hopkins said. "It now appears that first quarter sales will be in the neighborhood of $8 million, with profits at a satisfactory rate."

Revises Iron Valve Order

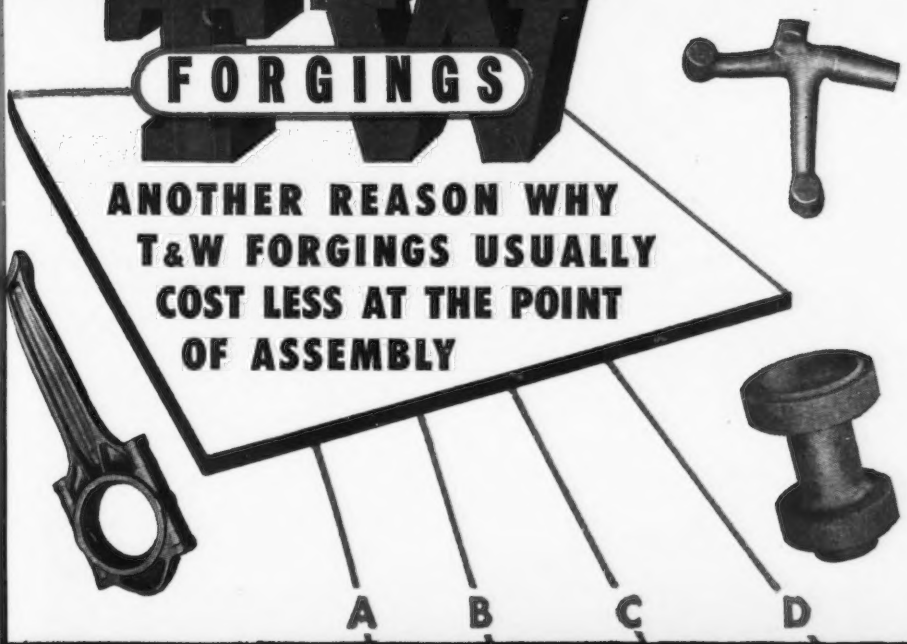
Washington

• • • **The proposed** revision of Simplified Practice Recommendation R184-42, Iron Body Valves, has been approved for promulgation, according to an announcement by the Div. of Simplified Practice of the National Bureau of Standards. The revised recommendation issued as of Mar. 1, 1947, will be identified as R184-47, Iron Valves.

As revised, the recommendation applies to the usual types of iron gate, globe, angle and check valves for primary pressures of 25, 125, 150 and 250-lb, and 100 and 800-lb pressures for water, oil and gas. A simplified range of sizes is given for the various types and kinds of valves for each of the pressure ratings. The recommendation will serve as a useful standard of practice in the production, distribution and use of these valves.

T&W FORGINGS

ANOTHER REASON WHY T&W FORGINGS USUALLY COST LESS AT THE POINT OF ASSEMBLY



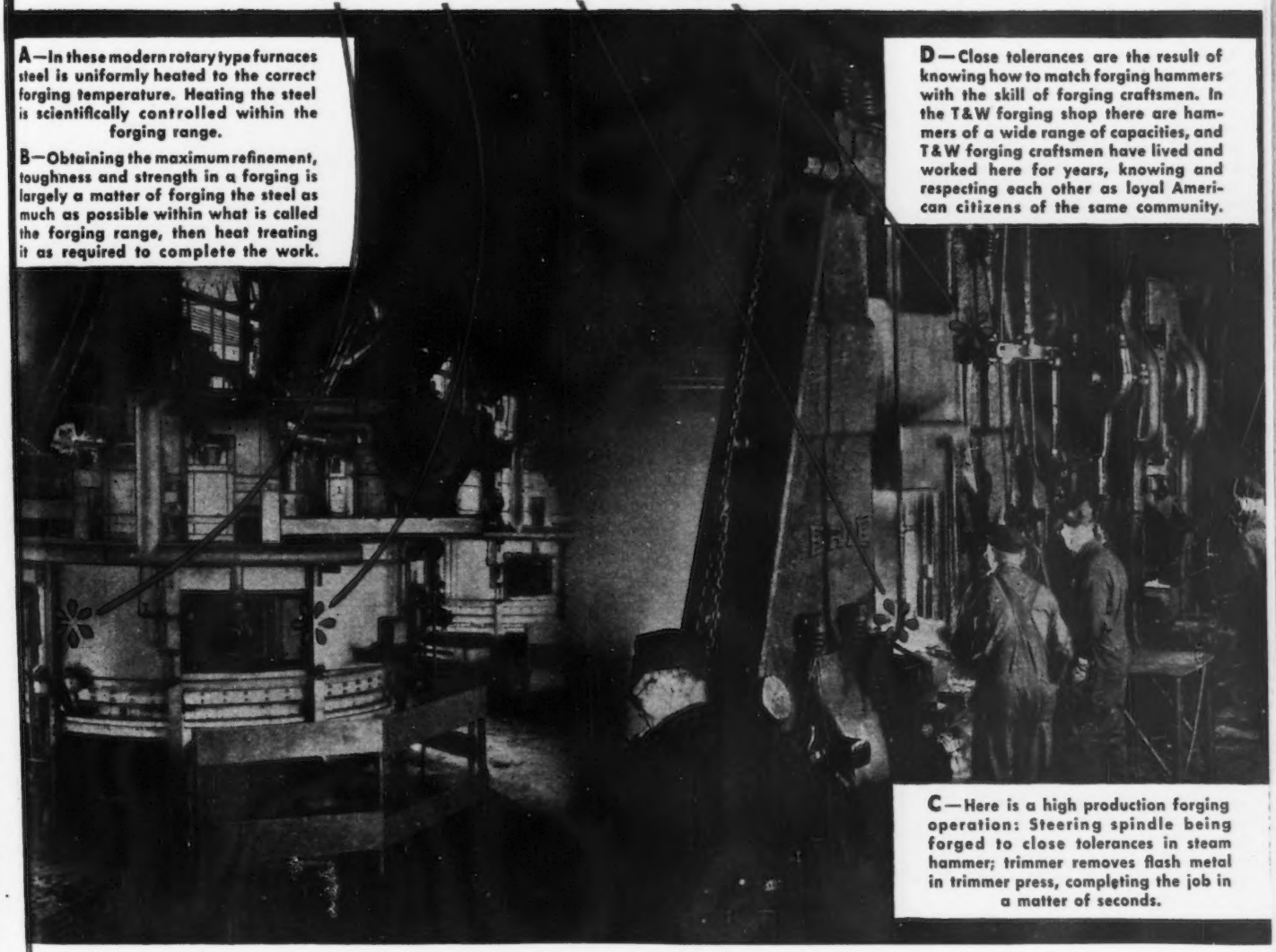
A B C D

Sixty seconds at the forging hammer may gain an hour by reducing the time it requires to machine or finish a forging. Uniformity of size and shape is achieved in a matter of seconds in forming the average forging. Close tolerance may require one extra blow or two extra blows in a forging hammer, but the effort to obtain it usually decreases the time it takes to machine or finish the forging, and thereby indirectly increases the capacity of both machines and men in finishing forgings. In the T & W forging shop there are hammers of a wide variety of capacities, and enough hammers to allow good judgment full sway in matching forging jobs to the hammer of right capacity with the skills of forging craftsmen. T & W forging craftsmen understand what is claimed by the statement "T & W forgings usually cost less at the point of assembly." They should. Their skill made that claim practical. Ask a T & W Forging Engineer to help you reduce the cost of forgings at the point of assembly.

A—In these modern rotary type furnaces steel is uniformly heated to the correct forging temperature. Heating the steel is scientifically controlled within the forging range.

B—Obtaining the maximum refinement, toughness and strength in a forging is largely a matter of forging the steel as much as possible within what is called the forging range, then heat treating it as required to complete the work.

D—Close tolerances are the result of knowing how to match forging hammers with the skill of forging craftsmen. In the T&W forging shop there are hammers of a wide range of capacities, and T&W forging craftsmen have lived and worked here for years, knowing and respecting each other as loyal American citizens of the same community.



C—Here is a high production forging operation: Steering spindle being forged to close tolerances in steam hammer; trimmer removes flash metal in trimmer press, completing the job in a matter of seconds.

TRANSUE & WILLIAMS

STEEL FORGING CORPORATION • ALLIANCE, OHIO

SALES OFFICES: NEW YORK • PHILADELPHIA • CHICAGO • INDIANAPOLIS • DETROIT • CLEVELAND

Offer Aluminum Films

New York

• • • **The Aluminum Co.** of America has added a new film, "This is Aluminum," to its library of sound films. The picture shows the production of aluminum including the mining of bauxite, refining the ore and its electrolytic reduction to metallic aluminum. The picture ends with a number of fabricating operations, casting, rolling, forging and extrusion.

In its library is a series of how-to-do-it films planned for those studying the fabrication and assembly of aluminum parts and structures. How to form aluminum is told in films having the following titles: General Sheet Metal Practice; Blanking and Piercing; Drawing, Stretching and Stamping; Tube and Shape Bending; and Spinning. Others in the series include How to Machine Aluminum; How to Rivet Aluminum; and How to Braze Aluminum. A series on the welding of aluminum includes Torch Welding; Arc Welding; and Resistance Welding.

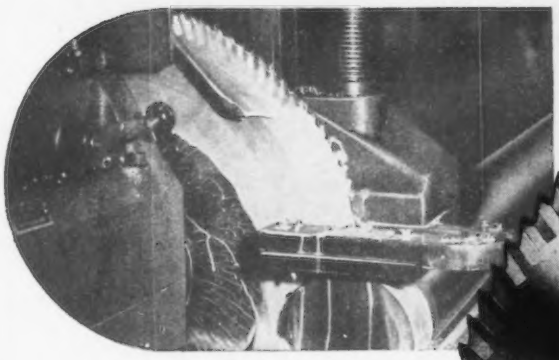
Films may be obtained without charge, except for transportation. from the Aluminum Co. of America, Gulf Building, Pittsburgh 19. Films are available in 16 mm and 35 mm sound versions only.

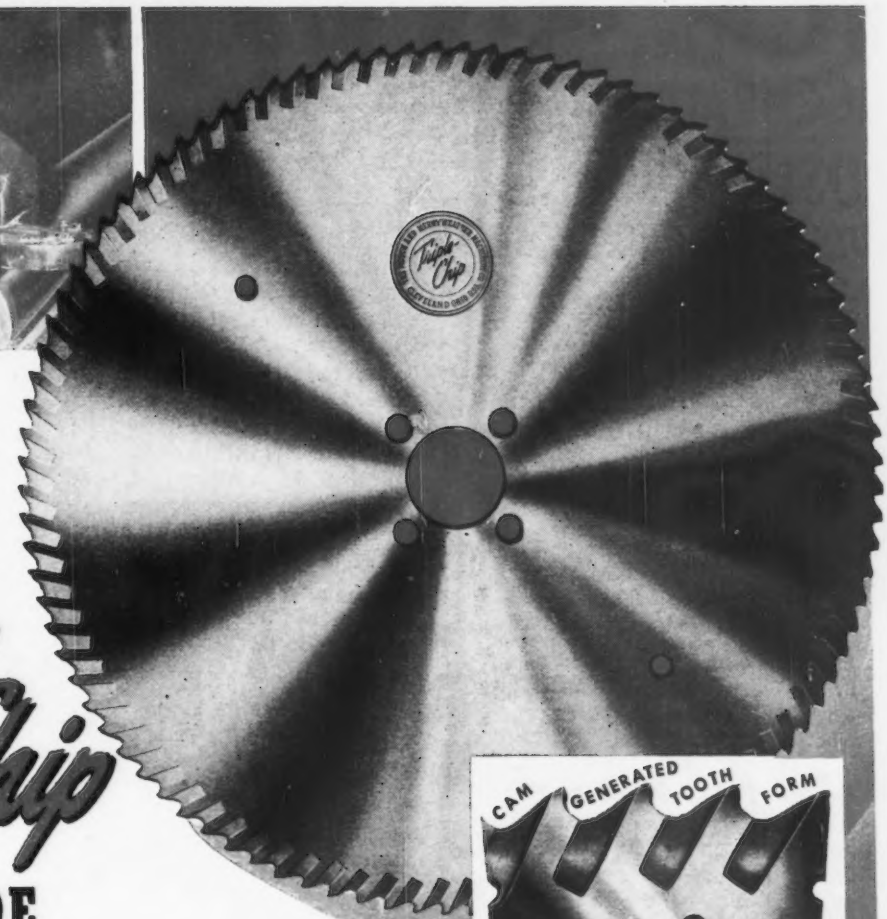
Dresser Fiscal Net Up

Cleveland

• • • **Dresser Industries, Inc.** has reported net earnings after taxes for the three months ended Jan. 31, 1947, of $728,581, as compared to a net loss of $516,574 for the first quarter of the company's previous year, and net earnings of $1,037,235 for its entire fiscal year ended Oct. 31, 1946, according to the company's quarterly letter to shareholders.

Sales for the first quarter of the current fiscal year totaled $16,669,845, continuing the accelerated rate established at the end of the previous year. Total sales for 1946 were $54,783,188, equivalent to a quarterly average of $13,695,797. Backlog has remained steady at approximately $67,000,000.





Now.. Triple-Chip SAW BLADE ADVANTAGES from 70 Inches Dia. Down to 6".

Triple-Chip METHOD

Segmental type blades in large sizes (as above) and solid type blades in smaller sizes (as below), but all the well known advantages of the Triple-Chip Method in both types "all the way up and down". That means clean, burr-less sections, uniform and accurate; surprising speeds with surprising performance records; extremely long blade life per grind; the right blade for every job. Motch & Merryweather Triple-Chip Blades team up with M. & M. Circular Sawing Machines to give the very finest results; they fit other makes, too. Also, Motch & Merryweather Automatic Blade Sharpening Machines impart the correct cam-generated tooth form for maximum efficiency. *Only M. & M. builds all three.*

A Motch & Merryweather engineer is always at your service to discuss your requirements with you.

M. & M. Triple-Chip Saw Blades excel for numerous milling and slitting operations.

Only M. & M. builds ALL 3: COLD SAW · SAW BLADE · BLADE GRINDER

THE MOTCH & MERRYWEATHER MACHINERY CO.
PENTON BUILDING CLEVELAND 13, OHIO

Completes Boring Of Chesapeake & Ohio's Double Track Tunnel

Cleveland

• • • **Boring** of the Chesapeake & Ohio Railway's newest and longest double track tunnel, being constructed on its main line at Fort Spring, W. Va., has been completed after nearly a year's work.

Bored from both ends through limestone containing clay seams which made drilling and blasting difficult, the new tunnel is approximately 2700 ft long from portal to portal.

The improvement, including relocation of tracks extending beyond the tunnel totals 1.09 miles and shortens the C & O main lines by 3600 ft. It reduces a 303 degree curvature, obviates a 35-mile slow order at this point and is expected to result in a saving of $80,000 a year in operating expenses. In addition to reducing running times, elimination of the curve will afford passengers greater comfort.

Work was begun at the west portal on Mar. 26, 1946, and at the east portal June 1, 1946. Steel ribs to support the tunnel roofs were placed as the excavation progressed. To move the solid rock, about 135 holes were drilled to a depth of 15 ft and shot every 24-hr cycle. Each blast advanced the tunnel approximately 12 ft.

Work was started immediately on the lining of the completed tunnel section with concrete. The tunnel will have a maximum width of 32 ft, maximum height of 26 ft, 6 in. above the top of the rails. It is expected that traffic will be routed through the new tunnel for the first time about Sept. 1, 1947.

To Leave Bureau of Mines

Washington

• • • **R. R. Sayers,** Director of the Bureau of Mines, is returning at the end of March to the U. S. Public Health Service from which he was detailed to the Dept. of Interior in 1940. James Boyd, Dean of the Colorado School of Mines, has been named by the President to succeed Dr. Sayers as Director of the Bureau of Mines.

Decries Use of a Set 20-Year Depreciation Schedule on Machines

Mount Gilead, Ohio

• • • **Comptrollers of** industrial corporations who cling to a set 20-year depreciation schedule because that is standard accounting procedure, may be driving their companies to business suicide, according to Col. Harry A. Toulmin, Jr., president, Hydraulic Press Mfg. Co.

In a signed article in the first issue of the company's new monthly, "Press Proofs," Colonel Toulmin stated that comptrollers are important people, but some of them don't have the right to answer the problem of lower production costs.

"A comptroller who doesn't know the difference between depreciation and obsolescence should consider his own case. He should not be surprised if one of these days he is replaced by a new model."

Colonel Toulmin points out that a machine is obsolete when it has ceased to do its work as economically as this can be done by a newer machine and more than a third of the metalworking machines in U. S. factories in operation today are more than 10 years old.

"A depreciation schedule of 8 to 10 years is suggested to replace the present 20-year practice. In normal times, customers can reasonably expect many a new machine to pay for itself in savings in 3 years or less."

Confirms Brazilian Credit

Washington

• • • **Reports that** a new credit of $7,500,000 has been granted the Brazilian Companhia Vale de Rio Doce of Brazil for financing the purchase in the United States of materials, equipment and services needed to rehabilitate the Victoria-Minas Railway and to develop company mining properties have been confirmed here by the Export-Import Bank.

This is in addition to a previous credit of $14 million in 1942 for the same purpose and expansion of the port facilities of Victoria, plus a credit of $5 million in 1945. The loan was authorized to expedite ore exports.

WAA "Customer Service Center" Arouses Washington Interest

New Merchandise Approach May Greatly Boost Sales Of War Surplus Items

Washington

• • • **With the opening** of its District of Columbia "Customer Service Center" literally within sight of the Capitol, Congressmen and other interested officials may observe the working of the War Assets Administration's latest approach to merchandising in a new attempt to boost sales of war surpluses.

At the end of opening day, WAA said, its salesmen had totaled approximately $1.1 million in orders, ranging from small lots of small items to railroad cars. The Real Property section reported approximately a score of inquiries as to available surplus plants and real estate.

Establishment of the customer service centers marks a wide departure from most of the disposal methods tried or practiced by the agency. There are now 46 in operation and WAA hopes to establish at least 100 in the nation's larger cities in the near future. WAA is admittedly racing against time—against the developing "buyers' market" when it can no longer name its own price but must bargain and haggle in order to obtain sales.

The centers are patterned after the service or sample rooms which are maintained by mail order houses where a customer may examine catalogs or flyers and enter orders. Like these mail order branches, no over-the-counter orders are taken. But the buyer has the opportunity of examining samples or blown-up photographs of the goods he wishes to buy and if satisfied may place an order then and there.

WAA goes even a little further. Before the order is signed, the salesman telephones or teletypes

o o o

SELLING SURPLUS: *WAA officials, explaining that there is a buyer's market in surplus now, are setting up customer service offices throughout the country. Their idea is to move the surplus quickly before the flood of reconverted production swamps the agency's stocks.*

o o o

the nearest regional office holding the merchandise in order to make sure the items are still in stock and have the amount of sale held until the official order is received.

"Orders will be taken for property within or without the region (where the center is located)," Mr. Littlejohn says, "and sales are completed in one place from start to finish, from inquiry to payment."

"Personnel at centers will be able to answer all inquiries about sales," he adds, "and will handle priority applications. Furthermore, any complaint may be brought to a center for adjudication."

A complete file on offerings in all regions will be maintained at all centers under the new procedure, it is emphasized. All kinds of offerings will be coordinated through the service centers including national and regional sales programs, fixed price, sealed bid, spot bid and auction sales. Property offered in any type may be purchased through the centers.

Customer service centers are now operating in these cities:

Alabama: Birmingham, 1955 50th St. N.

Arkansas: Little Rock, 515 E. Second St.

California: Fresno, South Maple St. Fairgrounds; Los Angeles, 155 W. Washington Blvd.; Sacramento, Bldg. T, McClellan Field, and San Francisco, 33 Berry St.

District of Columbia: Washington, Tempo R, Fourth St. & Jefferson Drive, S. W.

Connecticut: Hartford, 463 Capitol Ave.

Florida: Jacksonville, Naval Air Station; Miami, Miami Air Depot, P. O. Box 2469; Tampa, Drew Field.

Georgia: Atlanta, 699 Ponce de Leon Ave., N. E.; Savannah, 202 W. Oglethorpe Ave.

Idaho: Boise, 609 Bannock St., P. O. Box 2783.

Louisiana: New Orleans, 7020 Franklin Ave., P. O. Station "D".

Maine: So. Portland, Pickett St.

Maryland: Baltimore, 8 S. Calvert St.

Mississippi: Jackson, 405½ W. Capitol St.

Missouri: St. Louis, 505 N. Seventh St.

Montana: Helena, Lawrence &

Warren St., P. O. Box 1161.

New Hampshire: Manchester, 88 Concord St.

New Jersey: Newark, Prudential Bldg., 10th Floor, 213 Washington St.

New York: N. Y. C., 37 B'way.

North Carolina: Charlotte, 317 S. Tryon St.; Greensboro, Overseas Replacement Depot.

Ohio: Cleveland, 13th & Euclid Sts.

Oklahoma: Oklahoma City, Bldg. T 24, Tinker Field, P. O. Box 426; Tulsa, 2000 N. Memorial Drive.

Oregon: Portland, Box 4062, Swan Island.

Rhode Island: Providence, Washington Ave.

South Carolina: Charleston, P. O. Box 275, Tradd St. & East Bay; Columbia, 1201 Pulaski St.; Greenville, 200 Main St.

Tennessee: Chattanooga, Ochs Bldg.; Memphis, McDonnell Aircraft Bldg. Winchester Pike; Nashville, Vultee Blvd.

Texas: Dallas, "B" Plant, North American Aviation Inc., P. O. Box 6030; El Paso, 620 Magoffin Ave.; Houston, 915 Milam Bldg.; San Antonio, Transit Tower Corner, South St. Mary's & Villita Sts.

Utah: Salt Lake City, 1710 S. Redwood Road.

Vermont: Burlington, Hotel Van Ness.

Virginia: Richmond, Army Air Base.

Washington: Seattle, 1409 Second Ave.; Spokane, 157 South Howard St., Welsh Building.

West Virginia: Charleston, Peoples Bank Bldg.

United Engineering Reports

Pittsburgh

• • • **United Engineering** & Foundry Co. reported net earnings for the year ended Dec. 31, 1946, of $1,723,151. The net income includes a $1,165,000 refund of Federal excess profits taxes and $465,794 non-recurring items of income. Net income for the year 1945 was $2,341,861. Net sales for 1946 were $24,195,150, compared with $41,545,310 in the preceding year.

Referring specifically to 1946 operations, it was pointed out that shortages of materials interfered with the completion of work in progress and resulted in an abnormally large inventory.